TOSHIBA

FILE NO. 030-200003

SERVICE MANUAL

COLOUR TELEVISION

C0SS Chassis

28N03F, 28N03B
28N03D, 28N01F

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CHAPTER 1 GENERAL ADJUSTMENTS

SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is (A) kV at zero beam current (minimum brightness) under a (C) V AC power source. The high voltage must not, under any circumstances, exceed (B) kV.

   Refer to table-1 for high voltage (A) , (B) & AC voltage (C). (See SETTING & ADJUSTING DATA on page 16)

   Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure in this manual. It is recommended that the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
3. Some part in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

SAFETY PRECAUTION

WARNING : Service should not be attempted by anyone unfamiliar with the necessary precautions on this receiver. The following are the necessary precautions to be observed before servicing this chassis.

1. An isolation transformer should be connected in the power line between the receiver and the AC line before any service is performed on the receiver.
2. Always discharge the picture tube anode to the CRT conductive coating before handling the picture tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled. Use shatter proof goggles and keep picture tube away from the unprotected body while handling.
3. When replacing a chassis in the cabinet, always be certain that all the protective devices are put back in place, such as; nonmetallic control knobs, insulating covers, shields, isolation resistor-capacitor network etc.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the international hazard symbols on the schematic diagram and the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire, X-ray radiation or other hazards.

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 3 OF THIS MANUAL.

SET-UP ADJUSTMENT

■ The following adjustments should be made when a complete realignment is required or a new picture tube is installed. Perform the adjustments in order as follows :

1. Color Purity
2. Convergence
3. White Balance

Note: The PURITY/CONVERGENCE MAGNET assembly and rubber wedges need mechanical positioning. Refer to figure 1.
Mounting position of the purity magnet assembly should fit to same position as old one because slightly difference to the postition depend on a kind of tube.

* There are no adjustment of purity and convergence in some picture tube (Unified with purity magnet)

COLOR PURITY ADJUSTMENT

NOTE : Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes.

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Set the brightness and contrast to maximum.
3. Use a green raster from among the built-in test signals.
4. Loosen the clamp screw holding the yoke and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and spread the tabs of the purity magnet (See figure 2.) around the neck of the picture tube until the green belt is in the center of the screen. At the same time, enter the raster vertically.
7. Slowly move the yoke forward or backward until a uniform green screen is obtained. Tighten the clamp screw of the yoke temporarily.
8. Check the purity of the red and blue raster.

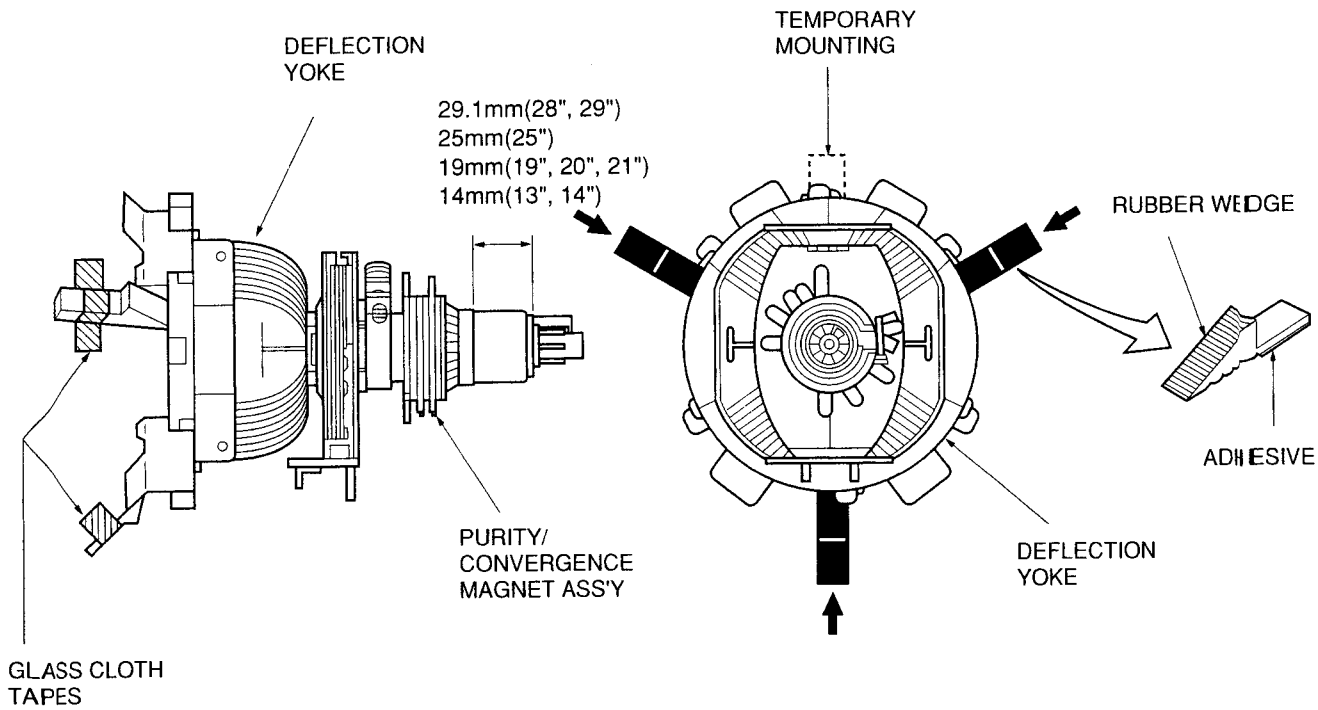


Figure 1.

CONVERGENCE ADJUSTMENTS

NOTE: Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

■ CENTER CONVERGENCE ADJUSTMENT

1. Use the cross-dot pattern from among the built-in test signals.
2. Set the brightness and contrast for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 2.) and superimpose red and blue vertical lines in the center area of the picture screen.
4. Turn the both tabs at the same time keeping the angle constant to superimpose red and blue horizontal lines at the center of the screen.
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 keeping in mind red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual interaction and make dot movement complex.

■ CIRCUMFERENCE CONVERGENCE ADJUSTMENT

1. Loosen the clamping screw of deflection yoke slightly to allow the yoke to tilt.
2. Temporarily put a wedge as shown in figure 1. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 3.) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 3.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick three adhesive tapes on wedges as shown in figure 1.

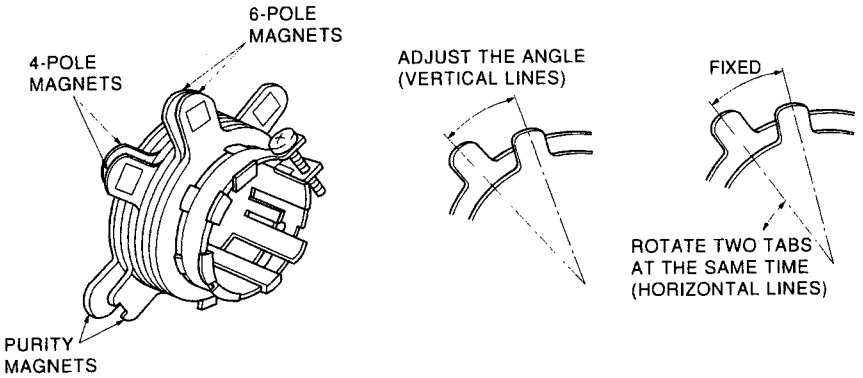
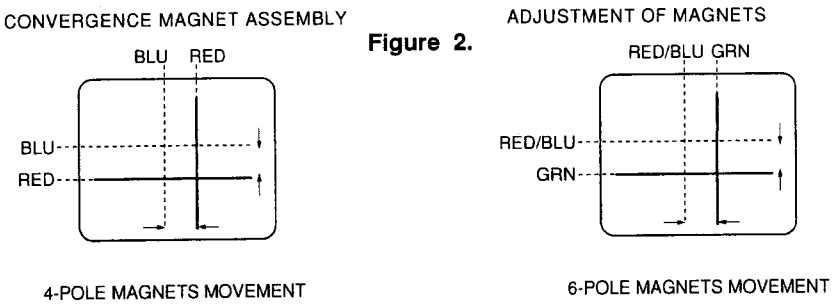


Figure 2.



Center Convergence by Convergence Magnets

Circumference Convergence by DEF Yoke

Figure 3. Dot Movement Pattern

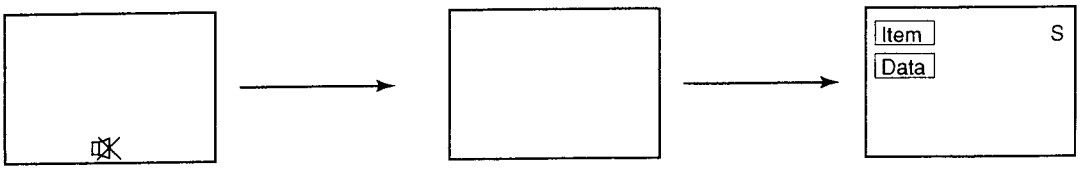
SERVICE MODE

1. ENTERING TO SERVICE MODE

1) Press 🔇 button once on Remote Control.

2) Press 🔇 button and keep hold down.

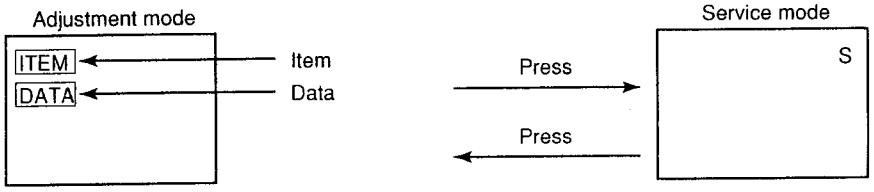
3) While the 🔇 button is held down, press the MENU button on TV set.



(Service mode display)

2. DISPLAYING THE ADJUSTMENT MENU

1) Press MENU button on TV to switch between screens.



3. KEY FUNCTION IN THE SERVICE MODE

The following key entry during display of adjustment menu provides special functions.

A single horizontal line ON/OFF:	- / - - button (on Remote)
Test signal selection :	N/A (Not available)
Selection of the adjustment items :	CHANNEL ▲/▼ (on TV & Remote)
Change of the data value :	VOLUME ◿ +/– (on TV & Remote)
Adjustment menu mode ON/OFF :	MENU button on TV
Initialization of the memory (QA02) :	CALL + CHANNEL button on TV (▲)
Reset the count of operating protect circuit to "00":	CALL + CHANNEL button on TV (▼)
AFT adj :	0 button
"RCUT" selection :	1 button
"GCUT" selection :	2 button
"BCUT" selection :	3 button
"CNTX" (or "SCNT") selection :	4 button
"COLC" selection :	5 button– – – – – Color thickness correction
"TNTC" selection :	6 button note: Displayed differently as shown below de-
Test audio signal ON/OFF (1kHz) :	N/A (Not available) pending on the setting of the receiving color
Self diagnostic display ON/OFF :	9 button system.
	COLP (PAL)
	COLC (NTSC)
	COLS (SECAM)

CAUTION : Never try to perform initialization unless you have changed the memory IC.

4. SELECTING THE ADJUSTING ITEMS

1)Every pressing of CHANNEL ▲ button in the service mode changes the adjustment items in the order of table-2. (▼ button for reverse order)

Refer to table-2 for preset data of adjustment mode. (See SETTING & ADJUSTING DATA on page 16)

5. ADJUSTING THE DATA

1) Pressing of VOLUME ◿ +/– button will change the value of data in the range from 00H to FFH. The variable range depends on the adjusting item.

6. EXIT FROM SERVICE MODE

1) Pressing POWER button to turn off the TV once or putting the set to Std. by mode by HHU.

■ INITIALIZATION OF MEMORY DATA OF QA02

After replacing QA02, the following initialization is required.

1. Enter the service mode, then select any register item.
2. Press and hold the CALL button on the remote, then press the CHANNEL ▲ button on the TV. The initialization of QA02 has been complated.
3. Check the picture carefully. If necessary, adjust any adjustment item above. Perform "Auto search Memory" on the owner's manual.

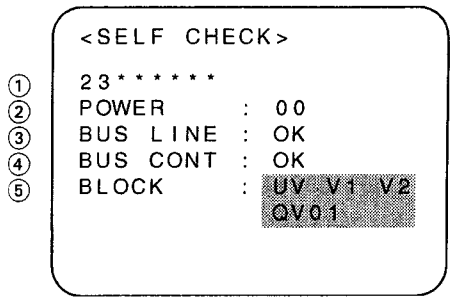
CAUTION: Never attempt to initialize the data unless QA02 has been replaced.

7. TEST SIGNAL SELECTION

N/A (Not available on this model)

8. SELF DIAGNOSTIC FUNCTION

1) Press "9" button on Remote Control during display of adjustment menu in the service mode.
   The diagnosis will begin to check if interface among IC's are executed properly.
2) During diagnosis, the following displays are shown.



Indicated color of mode now selected : Green and Red
Indicated color of other modes : White

Green : Normal
Red : The microcomputer operates to provide judgement of no video signal. The red color is still indicated though the signal is input, failure may exist in input signal line including QV01.
QV01 : In case of indication green ---Normal
In case of indication red with input signal----
Failure may exist in output line including QV01.

① Part number of microcomputer (QA01)
② Operation number of protecting circuit ----"00" is normal.
When indication is other than "00", overcurrent apts to flow, and circuit parts may possibly be damaged.
③ BUS LINE CHECK ----"OK" is normal.
"SCL(SCL1)-GND" ..... SCL-GND short circuit
"SDA(SDA1)-GND" ..... SDA-GND short circuit
"SCL(SCL1)-SDA (SDA1)" ... SCL-SDA short circuit
④ BUS CONT ----"OK" is normal.
When indication shows "Q ○○○ NG", the device with the number may possibly be damaged.
⑤ BLOCK
UV : TV reception mode
V1 : VIDEO 1 input mode (→①1)
V2 : VIDEO 2 input mode (→①2)

NOTE: Component which controls character display on screen is QA01/QR01 (Micro/RGB switch IC). If this display function fails to operate due to damage in QA01 or QR01, self diagnosis procedure is as follows.
(1) In case that power indicator is blinking with interval of 0.5 seconds; it means protecting circuit (Current limiter) is operating, and circuit components may possibly be damaged. Check related components.
(2) In case that power indicator is blinking with interval of 1 second; Protecting circuit does not operate, but a part of Bus line does not operate normally. Check Bus line.

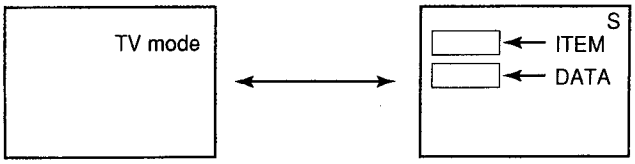
* The items marked with ▒ are not usable to display in the SELF DIAGNOSTIC FUCTION for some model.

9. DATA SELECTION

1. Enter Service mode

1) Select the Service mode.

2) Press MENU button on TV to select data on/off.



(Adjustment mode)

When QA02 is initialized, items "OPT" of SERVICE MODE are set to the data of the representative model of this chassis family. Therefore, because ON-SCREEN specification remains in the state of the representative of model. This model is required to reset the data of items "OPT".

2. SELECTING THE ADJUSTING ITEMS

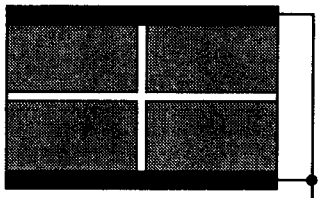
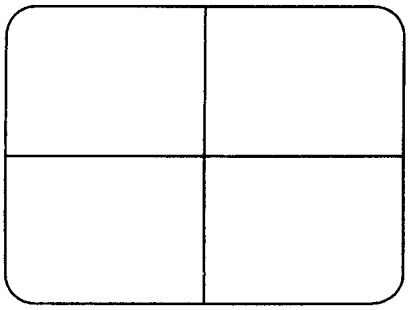
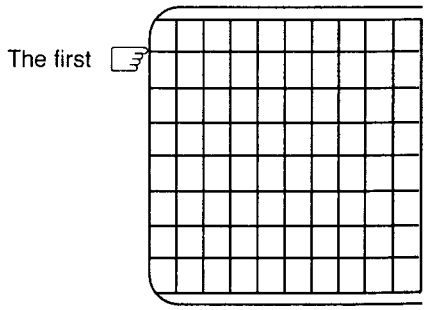
Every pressing of POSITION ▲ or ▼ button in the service mode changes the adjustment items in the order of table-3.

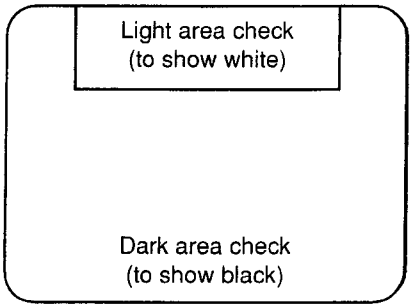
Refer to table-3 for data of design mode.
(See SETTING & ADJUSTING DATA on page 16)

3. ADJUSTING THE DATA

Pressing of VOLUME ▲ or ▼ (◿ +/–) button will change the value of data.

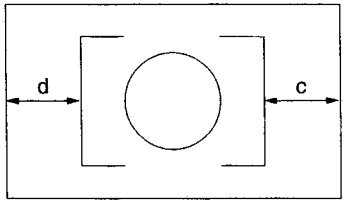
ELECTRICAL ADJUSTMENTS

ITEM	ADJUSTMENT PROCEDURE
FOCUS VR ADJ.	1. Display black cross bar pattern from EXT source. 2. Adjust the FOCUS control (on T461) for well defined scanning lines on the picture screen.
SUB-BRIGHTNESS (BRTC) Note: Constrict the picture height until the vertical retrace line appears adjusting the item HIT (HEIGHT).	1. Set CONTRAST to minimum, and BRIGHTNESS to center by adjusting user controls. 2. Use external signal source to get white cross-bar of inside pattern. 3. Select BRTC (brightness correction), and adjust the ◿ – /+ button to reduce the value so that white portion of inside pattern slightly light. 4. Adjust ◿ – /+ button to increase the data value of BRTC, and set it just before the difference between the belt of vertical retrace and the border of black portion of inside pattern is visible. After that, return vertical height and contrast.  Belt of vertical retrace
HORIZONTAL POSITION ADJUSTMENT (HPOS) VERTICAL POSITION ADJUSTMENT (VPOS)	1. Use external signal source to get black or white cross-bar signal and select service mode. 2. Select either HPOS (Horizontal picture phase) or VPOS (Vertical picture phase) with CHANNEL ▲, ▼ buttons, and adjust horizontal or vertical picture position in the center of screen with VOLUME ◿ – /+ buttons. 
VERTICAL AMPLITUDE ADJUSTMENT (HIT)	1. Use external signal source to get black or white cross-bar signal and select service mode. 2. Select HIT (Vertical amplitude) with CHANNEL ▲, ▼ buttons, and adjust vertical amplitude with VOLUME ◿ – /+ buttons so that vertical amplitude lacks a little. 3. Adjust vertical amplitude with VOLUME ◿ – /+ buttons so that the first bar on cross-hatch signal touches edge of screen. 

ITEM	ADJUSTMENT PROCEDURE
WHITE BALANCE ADJUSTMENT • CUTOFF ADJUSTMENT (RCUT) (GCUT) (BCUT) • DRIVE ADJUSTMENT (GDRV) (BDRV)	1. Set Contrast to 40, and brightness to +20 by picture control. 2. Set the TV in service mode, and use W/B adjusting signal. 3. Select RCUT, GCUT and BCUT with CHANNEL ▲, ▼ buttons, to set individual values to 20, and to set GDRV and BDRV to 40 with VOLUME ◿ – /+ buttons. 4. Press [-/- -] button on the remote control and rotate Screen VR to get one slight horizontal line on screen. Note: Every pressing of [-/- -] button provides Horizontal line picture and Normal picture alternately. 5. Adjust the other two cut off colours to get a slight white horizontal lines, use the HHU buttons "1, 2, 3" or CHANNEL ▲ or ▼ buttons. Then tap VOLUME ◿ – /+ buttons so that three colours slightly light to the same level resulting in a white line. Then press [-/--] button to give full scan (Normal picture). ※ To correct white balance in light area, select GDRV and BDRV with CHANNEL ▲, ▼ buttons to adjust. ※ To correct white balance in dark area, perform fine adjustment of RCUT, GCUT and BCUT. 

Item	Name	Setting	Input signal	Measuring point	Adjustment method	Adjustmen standard
VCO	VCO	N/A	No need	Usual case OSD Check Rare case IC501 #55	Put set into Service mode Check OSD if it is "COIL OK". If OSD is "COILING" continue next action. Send AFT adj code by HHU command. With data displayed on screen press "0" on HHU (This is code 40 BF F6) Connect a volt-meter to pin 55 of the Q501. Then adjust the L161.	In case of "COIL OK". N/A IC Auto Adjust In case of "COIL NG" Voltage of pin 55 2.5V±1V
AGC	AGC	N/A	CW@38.9MHz 0% modulation 100 dBuv Level Factory Gen 206A Set polarity reverse Set system to WG	OSD check	(A) Open IF and AGC solder pads Apply input signal Put set into S mode Send AGC code 40 BF F7 Wait for OSD display to change to "AGC OK"	N/A IC Auto Adjust
					(B) or Feed-in the colour Bar Signal with sound (RF 90dB uF) Adjust AGC Bus data so as to get the good S/N picture and no inter modulation apperance	
BRTC	Sub-bright adjustment	Contrast: Max. Bright: Center Colour: Min.	Sub-bright signal	Screen adjustment	1. This item shall be adjusted after the screen VR adjustment and white balance adjustment 2. Adjust the number of collapsed black lines of the sub-bright signal	4±1.5 lines

Item	Name	Setting	Input signal	Measuring point	Adjustment method	Adjustmen standard
RCUT GCUT BCUT Screen VR GDRV BDRV	Screen adjustment and white balance adjustment (R cutoff) (G cutoff) (B cutoff) (Screen)	RCUT ┐ GCUT ├ 20H BCUT ┘ GDRV ┐ BDRV ┘ 40H Activated horizontal straight line mode (Local video key)		Screen adjustment	1. Set the conditions as shown left. 2. Gradually raise the screen brightness until either of R, G or B lines starts to gleam slightly 3. Determine that point as the screen VR adjustment position. 4. Using RCUT, GCUT and BCUT, raise the brightness of two lines except the one that gleamed in step 2 until these lines start to gleam slightly (ie make the screen almost white). 5. Release the horizontal straight line mode (Local video key). 6. Using the white balance checker, repeat the adjustment steps until both bright and dark parts become correct vlaue.	HIGH LIGHT (103cd/m²) 8750K-0.002uv DARK (17cd/m²) 8750K-0.002uv * Adjustment range is the same as before
SRY SBY	Secam Black level adjustment. R-Y axis B-Y axis	Contrast: Max Bright: Center Colour: Center	Secam Colour bar	SRY IC501 #20 SBY IC501 #22	1. Adjust the level of B/W part of the colour difference signal to the level of H BLK part. 2. Adjust the R-Y axis and B-Y axis by SRY and SBY data items respectively.	
HIT VPOS	Height Vertical Position	Visual adjustment with a picture (bus control)	WG Philips Pattern. Do not use the Philips pattern for France Secam.	Screen adjustment	1. Condition, Contrast Max, Brightness Center Colour Center. 2. Adjustment procedure a) Adjust V. Postion by the sub-address Vpos so that the Vertical center of the circle of Philips pattern comes to center of screen. b) Adjust the screen by the sub-address HIT so that the top and bottom flags of the Philips pattern just go off the screen.	

Item	Name	Setting	Input signal	Measuring point	Adjustment method	Adjustmen standard
HPOS	Horizontal Position	Visual adjustment with a picture (bus control)	WG Philips Pattern. Do not use the Philips pattern for France Secam.		 1. Condition, Contrast Max, Brightness Center Colour Center. 2. Adjust HPOS so that d- and c are equal.	
WID PARA TRAP	Horizontal width Pincushion Distor-tion Keystone Distortion	Visual Adjustment with a picture (Bus Control)	WG Philips Pattern. Do not use the Philips pattern for France Secam.		1. Condition: After adjusting HIT, VPOS and HPOS Set contrast-Max, Bright-Cent, Colour-Cent. 2. Adjustment Procedure a. Adjust WID so that the left and right white glags of Philips pattern just go off the screen. b. Adjust PARA to make vertical bars straight c. Adjust TRAP to correct the keystone distortion d. Again, adjust the WID	

CIRCUIT CHECK

HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis. Checking should be done following the steps below.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST controls to minimum (zero beam current).
3. High voltage must be measured below (B) kV.

Refer to table-1 for high voltage (B).
(See SETTING & ADJUSTING DATA on page 16)

4. Vary the BRIGHTNESS control to both extremes to be sure the high voltage does not exceed the limit under any conditions.

CHAPTER 2 SPECIFIC INFORMATIONS

SETTING & ADJUSTING DATA

【 SAFETY INSTRUCTIONS 】

		28"
HIGH VOLTAGE AT ZERO BEAM:	(A)	28.3 kV
MAX HIGH VOLTAGE:	(B)	32.0 kV
AC VOLTAGE:	(C)	220~240V

Table-1

【 SERVICE MODE 】

ADJUSTING ITEMS AND DATA IN THE SERVICE MODE:

Item	Name of adjustment	Preset	Data
RCUT	R CUTOFF	20H	←
GCUT	G CUTOFF	20H	←
BCUT	B CUTOFF	20H	←
GDRV	G DRIVE	40H	←
BDRV	B DRIVE	40H	←
BRTC	SUB-BRIGHT	40H	80H
HPOS	H-POSITION (50Hz)	0CH	←
VPOS	V-POSITION	04H	←

Item	Name of adjustment	Preset	Data
HIT	HEIGHT	19H	←
WID	PICTURE WIDTH	0EH	←
PARA	E-W PARABORA	0CH	←
TRAP	TRAPEZIUM	13H	←
SRY	SECAM R-Y BLACK LEVEL	08H	←
SBY	SECAM B-Y BLACK LEVEL	07H	←
RAGC	RF AGC	27H	←

Table-2

【 DESIGN MODE 】

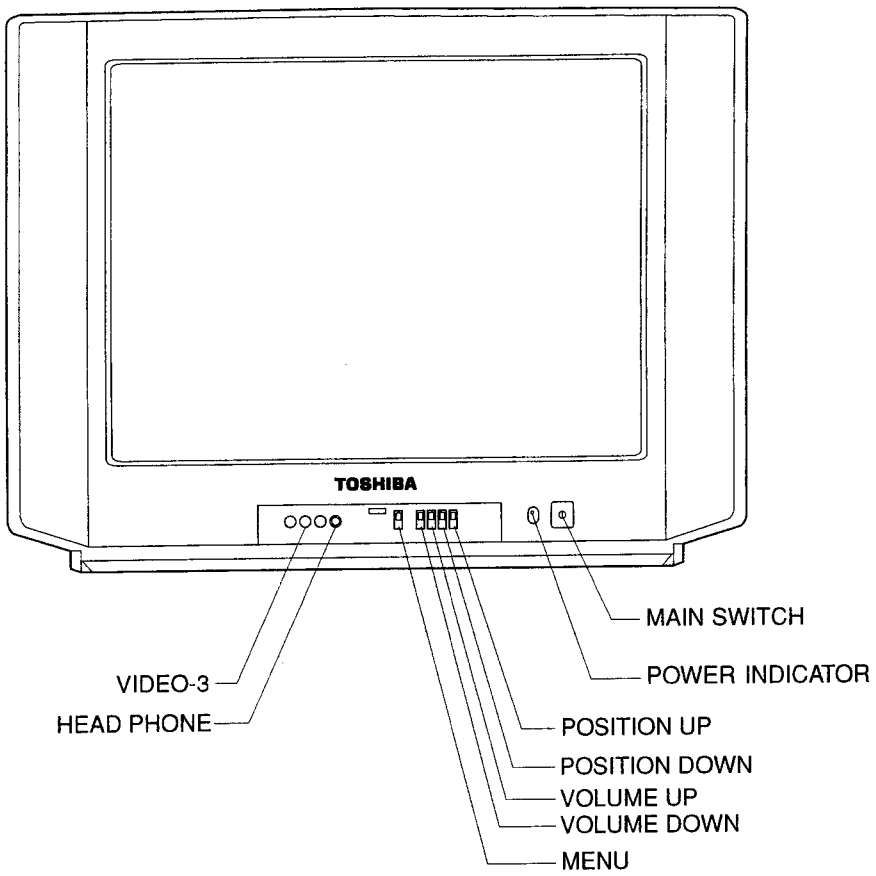
ADJUSTING ITEMS AND DATA IN THE DESIGN MODE:

Item	Name of adjustment	Preset Data	Data		
			28N03F	28N03B	28N03D
OPT	OPTION	02H	00H	20H	31H

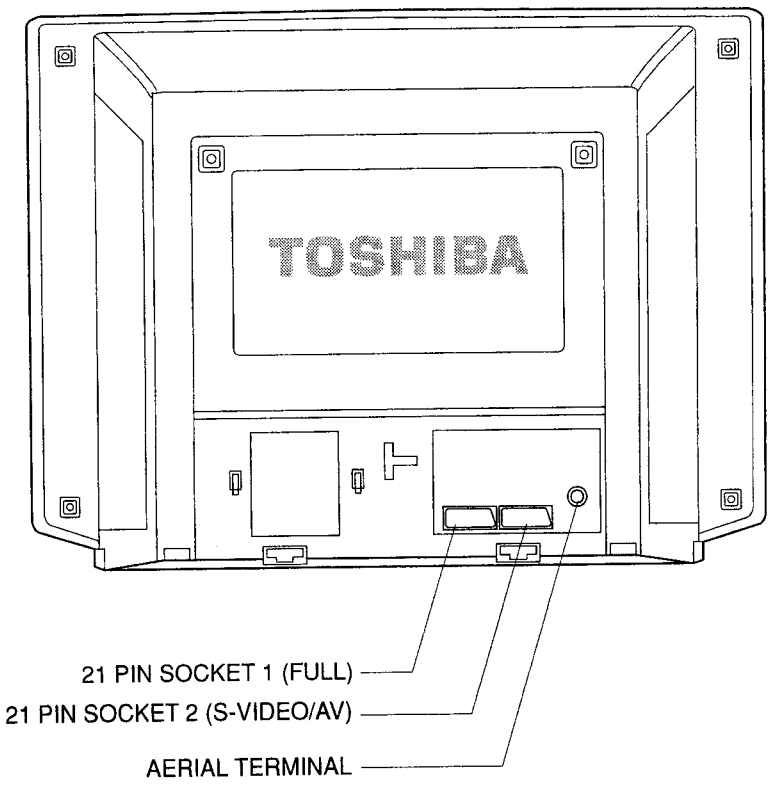
Table-3

LOCATION OF CONTROLS

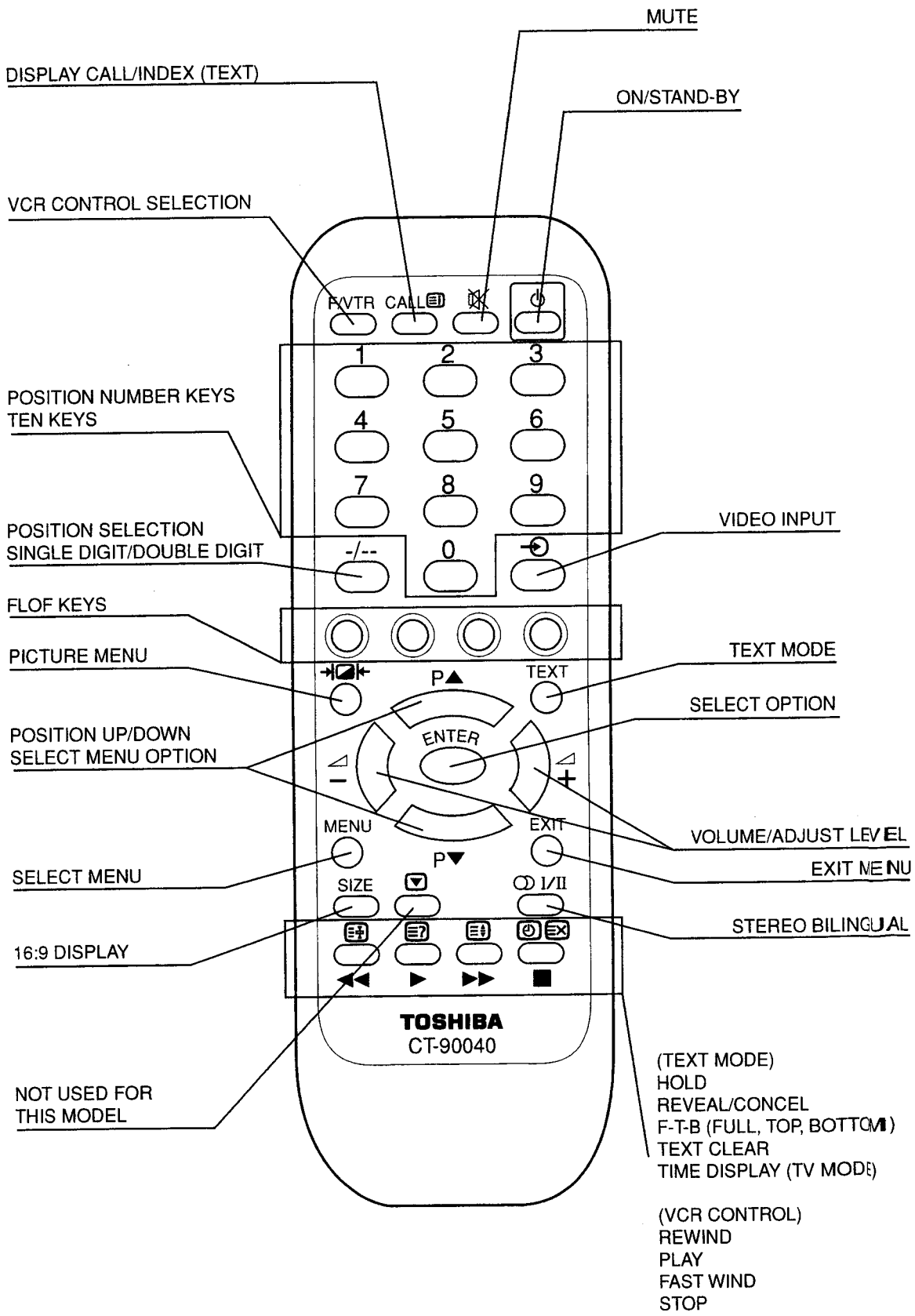
FRONT



REAR



REMOTE


MUTE
DISPLAY CALL/INDEX (TEXT)
ON/STAND-BY
VCR CONTROL SELECTION
TV/VTR
CALL
POSITION NUMBER KEYS
TEN KEYS
1
2
3
4
5
6
7
8
9
POSITION SELECTION
SINGLE DIGIT/DOUBLE DIGIT
-/--
0
VIDEO INPUT
FLOF KEYS
PICTURE MENU
TEXT MODE
P▲
TEXT
SELECT OPTION
POSITION UP/DOWN
SELECT MENU OPTION
ENTER
VOLUME/ADJUST LEVEL
MENU
EXIT
EXIT MENU
P▼
SELECT MENU
SIZE
I/II
STEREO BILINGUAL
16:9 DISPLAY
TOSHIBA
CT-90040
NOT USED FOR
THIS MODEL
(TEXT MODE)
HOLD
REVEAL/CONCEL
F-T-B (FULL, TOP, BOTTOM)
TEXT CLEAR
TIME DISPLAY (TV MODE)
(VCR CONTROL)
REWIND
PLAY
FAST WIND
STOP

CHASSIS AND CABINET REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 3 OF THIS MANUAL.

CAUTION: The international hazard symbols "⚠" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 3. Do not degrade the safety of the receiver through improper servicing.

NOTICE:

- *The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.*
- *The PC board assembly with * mark is no longer available after the end of the production.*

Models : 28N03F, 28N03B, 28N03D, 28N01F

Capacitors ..... CD : Ceramic Disk PF : Plastic Film EL : Electrolytic
Resistors ..... CF : Carbon Film CC : Carbon Composition MF : Metal Film
OMF : Oxide Metal Film VR : Variable Resistor FR : Fusible Resistor

(All CD and PF capacitors are ±5%, 50V and all resistors, ±5%, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C103	24232103	CD, 0.01μF, +80%, -20%
C104	24232103	CD, 0.01μF, +80%, -20%
C106	24567474	PF, 0.47μF
C107	24232103	CD, 0.01μF, +80%, -20%
C108	24232103	CD, 0.01μF, +80%, -20%
C109	24232103	CD, 0.01μF, +80%, -20%
C110	24232103	CD, 0.01μF, +80%, -20%
C111	24567474	PF, 0.47μF
C112	24436160	CD, 16pF (28N03F/28N01F)
C113	24232103	CD, 0.01μF, +80%, -20% (28N03F/28N01F)
C114	24794470	EL, 47μF, ±20%, 16V (28N03F/28N01F)
C114	24797229	EL, 2.2μF, ±20%, 50V (28N03B/28N03D)
C115	24232103	CD, 0.01μF, +80%, -20%
C116	24539104	PF, 0.1μF
C117	24232103	CD, 0.01μF, +80%, -20%
C120	24232103	CD, 0.01μF, +80%, -20% (28N03F/28N01F)
C121	24232103	CD, 0.01μF, +80%, -20%
C123	24794221	EL, 220μF, ±20%, 16V
C124	24232103	CD, 0.01μF, +80%, -20%
C130	24436470	CD, 47pF (28N03F/28N01F)
C160	24794101	EL, 100>, ±20%, 16V
C161	24797478	EL, 0.47μF, ±20%, 50V
C162	24212332	CD, 3300pF, ±10%
C163	24539104	PF, 0.1μF
C164	24539104	PF, 0.1μF
C165	24794100	EL, 10μF, ±20%, 16V
C166	24797010	EL, 1μF, ±20%, 50V
C168	24794100	EL, 10μF, ±20%, 16V
C169	24590103	PF, 0.01μF
C180	24797229	EL, 2.2μF, ±20%, 50V
C181	24212102	CD, 1000pF, ±10%
C183	24794101	EL, 100μF, ±20%, 16V
C188	24797100	EL, 10μF, ±20%, 50V
C189	24232103	CD, 0.01μF, +80%, -20%
C190	24232103	CD, 0.01μF, +80%, -20%
C199	24797100	EL, 10μF, ±20%, 50V

Location No.	Part No.	Description
C201	24794101	EL, 100μF, ±20%, 16V
C215	24567473	PF, 0.047μF
C216	24797478	EL, 0.47μF, ±20%, 50V
C221	24436100	CD, 10pF, ±0.25pF
C222	24436100	CD, 10pF, ±0.25pF
C223	24436100	CD, 10pF, ±0.25pF
C224	24794220	EL, 22μF, ±20%, 16V
C226	24567104	PF, 0.1μF
C233	24797010	EL, 1μF, ±20%, 50V
C303	24214221	CD, 220pF, ±10%, 500V
C305	24617912	EL, 2.2μF, ±10%, 50V
C306	24667332	EL, 3300μF, ±20%, 25V
C307	24082049	PF, 0.047μF, 100V
C308	24668221	EL, 220μF, ±20%, 35V
C309	24590102	PF, 1000pF
C310	24668332	EL, 3300μF, ±20%, 35V
C311	24214152	CD, 1500pF, ±10%, 500V
C313	24082057	PF, 0.22μF, 100V
C314	24591563	PF, 0.056μF
C319	24590102	PF, 1000pF
C320	24796479	EL, 4.7μF, ±20%, 35V
C321	24797478	EL, 0.47μF, ±20%, 50V
C326	24567474	PF, 0.47μF
C370	24794101	EL, 100μF, ±20%, 16V
C371	24794100	EL, 10μF, ±20%, 16V
C403	24590822	PF, 0.0082μF
C404	24797478	EL, 0.47μF, ±20%, 50V
C405	24212221	CD, 220pF, ±10%
C406	24212101	CD, 100pF, ±10%
C410	24092341	CD, 470pF, ±10%, 2kV
C413	24214391	CD, 390pF, ±10%, 500V
C416	24214821	CD, 820pF, ±10%, 500V
C417	24709010	EL, 10μF, ±20%, 200V
C423	24829623	PF, 0.063μF, 400V
C430	24212102	CD, 1000pF, ±10%
C432	24590103	PF, 0.01μF
C433	24794100	EL, 10μF, ±20%, 16V
C434	24794222	EL, 2200μF, ±20%, 16V
C435	24212102	CD, 1000pF, ±10%
C440	24082478	PF, 0.0062μF, 1500V
C441	24082669	PF, 0.33μF, 250V

Location No.	Part No.	Description
C442	24082672	PF, 0.43μF, 250V
C443	24214472	CD, 4700pF, ±10%, 500V
C444	24082517	PF, 0.0051μF, 1800V
C445	24095903	PF, 0.056μF, ±10%, 250V
C446	24679330	EL, 33μF, ±20%, 250V
C448	24640908	EL, 33μF, ±20%, 160V
C449	24667102	EL, 1000μF, ±20%, 25V
C450	24797478	EL, 0.47μF, ±20%, 50V
C451	24567224	PF, 0.22μF
C452	24591563	PF, 0.056μF
C463	24212222	CD, 2200pF, ±10%
C464	24676339	EL, 3.3μF, ±20%, 100V
C466	24095883	PF, 0.015μF, ±3%, 630V
C470	24794220	EL, 22μF, ±20%, 16V
C471	24567474	PF, 0.47μF
C473	24567474	PF, 0.47μF
C491	24082721	PF, 1.5μF, 250V
C492	24082673	PF, 0.47μF, 250V
C512	24212222	CD, 2200pF, ±10%
C516	24232103	CD, 0.01μF, +80%, -20%
C517	24794100	EL, 10μF, ±20%, 16V
C521	24567104	PF, 0.1μF
C522	24567104	PF, 0.1μF
C523	24567104	PF, 0.1μF
C524	24794101	EL, 100μF, ±20%, 16V
C525	24590103	PF, 0.01μF
C526	24590222	PF, 2200pF
C527	24353090	CD, 9pF, ±0.25pF, CH
C528	24206228	EL, 0.22μF, ±20%, 50V
C531	24794100	EL, 10μF, ±20%, 16V
C535	24797100	EL, 10μF, ±20%, 50V
C536	24797478	EL, 0.47μF, ±20%, 50V
C537	24794471	EL, 470μF, ±20%, 16V
C540	24436561	CD, 560pF
C541	24436561	CD, 560pF
C542	24436561	CD, 560pF
C601	24797478	EL, 0.47μF, ±20%, 50V
C603	24232103	CD, 0.01μF, +80%, -20%
C621	24590103	PF, 0.01μF
C626	24797470	EL, 47μF, ±20%, 50V
C633	24567124	PF, 0.12μF
C634	24567124	PF, 0.12μF
C636	24797010	EL, 1μF, ±20%, 50V
C637	24667470	EL, 47μF, ±20%, 25V
C638	24667470	EL, 47μF, ±20%, 25V
C639	24796102	EL, 1000μF, ±20%, 35V
C641	24795470	EL, 47μF, ±20%, 25V
C642	24797010	EL, 1μF, ±20%, 50V
C643	24797479	EL, 4.7μF, ±20%, 50V
C644	24667102	EL, 1000μF, ±20%, 25V
C645	24667102	EL, 1000μF, ±20%, 25V
C647	24232103	CD, 0.01μF, +80%, -20%
C648	24797479	EL, 4.7μF, ±20%, 50V
C649	24797479	EL, 4.7μF, ±20%, 50V
C674	24590102	PF, 1000pF
C677	24590102	PF, 1000pF
C684	24232103	CD, 0.01μF, +80%, -20%
C685	24232103	CD, 0.01μF, +80%, -20%
C696	24794102	EL, 1000μF, ±20%, 16V
⚠C801	24503055	PF, 0.22μF, ±20%, 275V
⚠C802	24503055	PF, 0.22μF, ±20%, 275V
C803	24095887	PF, 0.01μF, ±3%, 630V
C804	24092343	CD, 680pF, ±10%, 2kV
C805	24092281	CD, 4700pF, ±20%, AC250V

Location No.	Part No.	Description
C806	24092281	CD, 4700pF, ±20%, AC250V
C808	24667331	EL, 330μF, ±20%, 25V
C810	24086037	EL, 270μF, ±20%, 400V
⚠C813	24094656	PF, 2200pF, ±20%, AC400V
⚠C814	24094656	PF, 2200pF, ±20%, AC400V
C817	24092337	CD, 220pF, ±10%, 2kV
C818	24214471	CD, 470pF, ±10%, 500V
C819	24797470	EL, 47μF, ±20%, 50V
C820	24214471	CD, 470pF, ±10%, 500V
C821	24214471	CD, 470pF, ±10%, 500V
C822	24567474	PF, 0.47μF
C827	24794102	EL, 1000μF, ±20%, 16V
C828	24212101	CD, 100pF, ±10%
C829	24590272	PF, 2700pF
C830	24092337	CD, 220pF, ±10%, 2kV
C831	24086916	EL, 330μF, ±20%, 160V
C833	24797100	EL, 10μF, ±20%, 50V
C835	24797479	EL, 4.7μF, ±20%, 50V
C836	24797100	EL, 10μF, ±20%, 50V
C837	24797100	EL, 10μF, ±20%, 50V
C840	24214471	CD, 470pF, ±10%, 500V
C846	24567104	PF, 0.1μF
C849	24214471	CD, 470pF, ±10%, 500V
C850	24796222	EL, 2200μF, ±20%, 35V
C851	24082934	PF, 1500pF, ±3%, 1500V
C852	24676220	EL, 22μF, ±20%, 100V
C860	24794470	EL, 47μF, ±20%, 16V
C862	24794101	EL, 100μF, ±20%, 16V
C878	24232103	CD, 0.01μF, +80%, -20%
C901	24700100	EL, 10μF, ±20%, 250V
C902	24092353	CD, 4700pF, ±10%, 2kV
C4370	24436471	CD, 470pF
CA01	24567104	PF, 0.1μF
CA02	24567104	PF, 0.1μF
CA03	24567104	PF, 0.1μF
CA04	24232103	CD, 0.01μF, +80%, -20%
CA05	24212101	CD, 100pF, ±10%
CA06	24232103	CD, 0.01μF, +80%, -20%
CA07	24436560	CD, 56pF
CA08	24436560	CD, 56pF
CA09	24232103	CD, 0.01μF, +80%, -20%
CA10	24567104	PF, 0.1μF
CA11	24797100	EL, 10μF, ±20%, 50V
CA12	24794470	EL, 47μF, ±20%, 16V
CA13	24232103	CD, 0.01μF, +80%, -20%
CA14	24797100	EL, 10μF, ±20%, 50V
CA16	24794100	EL, 10μF, ±20%, 16V
CA28	24212221	CD, 220pF, ±10%
CA29	24212221	CD, 220pF, ±10%
CB01	24797010	EL, 1μF, ±20%, 50V
CB02	24436181	CD, 180pF
CB02	24794470	EL, 47μF, ±20%, 16V
CB03	24794330	EL, 33μF, ±20%, 16V
CB04	24590392	PF, 0.0039μF
CB05	24212561	CD, 560pF, ±10%
CR01	24203100	EL, 10μF, ±20%, 16V
CR02	24797010	EL, 1μF, ±20%, 50V
CR03	24797010	EL, 1μF, ±20%, 50V
CR04	24797010	EL, 1μF, ±20%, 50V
CR05	24797010	EL, 1μF, ±20%, 50V
CR06	24797010	EL, 1μF, ±20%, 50V
CR07	24797010	EL, 1μF, ±20%, 50V
CR08	24353270	CD, 27pF, CH
CV01	24590103	PF, 0.01μF

Location No.	Part No.	Description
CV02	24797010	EL, 1μF, ±20%, 50V
CV03	24797010	EL, 1μF, ±20%, 50V
CV04	24085946	EL, 10μF, ±20%, 16V, Non-Polar
CV05	24797010	EL, 1μF, ±20%, 50V
CV06	24797010	EL, 1μF, ±20%, 50V
CV07	24794100	EL, 10μF, ±20%, 16V
CV08	24797010	EL, 1μF, ±20%, 50V
CV09	24794100	EL, 10μF, ±20%, 16V
CV10	24794100	EL, 10μF, ±20%, 16V
CV11	24590103	PF, 0.01μF
CV12	24794100	EL, 10μF, ±20%, 16V
CV13	24797010	EL, 1μF, ±20%, 50V
CV15	24794100	EL, 10μF, ±20%, 16V
CV16	24232103	CD, 0.01μF, +80%, -20%
CV17	24794101	EL, 100μF, ±20%, 16V
CV18	24212102	CD, 1000pF, ±10%
CV19	24212471	CD, 470pF, ±10%
CV20	24212102	CD, 1000pF, ±10%
CV21	24212102	CD, 1000pF, ±10%
CV22	24212471	CD, 470pF, ±10%
CV23	24212102	CD, 1000pF, ±10%
CV24	24794101	EL, 100μF, ±20%, 16V
CV25	24212152	CD, 1500pF, ±10%
CV27	24212102	CD, 1000pF, ±10%
CV28	24212102	CD, 1000pF, ±10%
CV29	24212152	CD, 1500pF, ±10%
CV30	24793471	EL, 470μF, ±20%, 10V
CV31	24794220	EL, 22μF, ±20%, 16V
CV32	24794220	EL, 22μF, ±20%, 16V
CV33	24793471	EL, 470μF, ±20%, 10V
CV34	24212102	CD, 1000pF, ±10%
CV35	24212102	CD, 1000pF, ±10%
CV36	24085988	EL, 1.0μF, ±20%, 50V, Non-Polar
CV37	24206108	EL, 0.1μF, ±20%, 50V
CV38	24794101	EL, 100μF, ±20%, 16V
CV39	24794220	EL, 22μF, ±20%, 16V (28N03B)
CV40	24797478	EL, 0.47μF, ±20%, 50V (28N03B)
CV41	24794220	EL, 22μF, ±20%, 16V (28N03B)
CV54	24794220	EL, 22μF, ±20%, 16V
CV98	24232103	CD, 0.01μF, +80%, -20%

RESISTORS

R101	24366271	CF, 270 ohm
R103	24366472	CF, 4700 ohm (28N03F/28N01F)
R104	24366472	CF, 4700 ohm (28N03F/28N01F)
R105	24366472	CF, 4700 ohm (28N03F/28N01F)
R106	24366360	CF, 36 ohm
R107	24366102	CF, 1k ohm
R108	24366562	CF, 5600 ohm
R110	24366681	CF, 680 ohm
R112	24366122	CF, 1200 ohm
R113	24366682	CF, 6800 ohm
R114	24366471	CF, 470 ohm
R115	24366360	CF, 36 ohm
R118	24366683	CF, 68k ohm
R119	24366133	CF, 13k ohm
R120	24366332	CF, 3300 ohm (28N03F/28N01F)

Location No.	Part No.	Description
R121	24366512	CF, 5100 ohm (28N03F/28N01F)
R126	24366332	CF, 3300 ohm (28N03F/28N01F)
R127	24366102	CF, 1k ohm (28N03F/28N01F)
R128	24366182	CF, 1800 ohm
R129	24366101	CF, 100 ohm
R130	24366103	CF, 10k ohm (28N03F/28N01F)
R132	24366471	CF, 470 ohm
R133	24366221	CF, 220 ohm
R135	24366101	CF, 100 ohm
R136	24366102	CF, 1k ohm
R167	24366151	CF, 150 ohm
R208	24366103	CF, 10k ohm
R209	24366103	CF, 10k ohm
R211	24366563	CF, 56k ohm
R215	24366104	CF, 100k ohm
R216	24366104	CF, 100k ohm
R216	24366824	CF, 820k ohm
R217	24366332	CF, 3300 ohm
R218	24366104	CF, 100k ohm
R218	24366513	CF, 51k ohm
R227	24366623	CF, 62k ohm
R228	24366271	CF, 270 ohm
R229	24366271	CF, 270 ohm
R230	24366271	CF, 270 ohm
R299	24366103	CF, 10k ohm
R301	24366102	CF, 1k ohm
R302	24383561	OMF, 560 ohm, 2W
R303	24321159	MF, 1.5 ohm, 1/2W
R304	24366124	CF, 120k ohm
R305	24322828	MF, 0.82 ohm, 1W
R306	24366683	CF, 68k ohm
R307	24366564	CF, 560k ohm
R310	24382391	OMF, 390 ohm, 1W
R313	24366473	CF, 47k ohm
R314	24366823	CF, 82k ohm
R327	24339229	MF, 2.2 ohm, 2W
R336	24383151	OMF, 150 ohm, 2W (28N03F/28N03D/28N01F)
R336	24383152	OMF, 1500 ohm, 2W (28N03B)
R344	24383391	OMF, 390 ohm, 2W
R370	24310109	MF, 1.0 ohm, 1/2W
R371	24366562	CF, 5600 ohm
R372	24366392	CF, 3900 ohm
R373	24366182	CF, 1800 ohm
R374	24366153	CF, 15k ohm
R402	24366103	CF, 10k ohm
R403	24366822	CF, 8200 ohm
R404	24366104	CF, 100k ohm
R405	24366472	CF, 4700 ohm
R405	24552472	OMF, 4700 ohm, 1/2W
R410	24366151	CF, 150 ohm
R411	24366561	CF, 560 ohm
R415	24553472	OMF, 4700 ohm, 1W
R417	24510432	Cement, 4300 ohm, 5W
R422	24366101	CF, 100 ohm
R430	24366223	CF, 22k ohm
R434	24366271	CF, 270 ohm
R441	24382102	OMF, 1k ohm, 1W
R442	24533151	FR, 150 ohm, 2W
R448	24322228	MF, 0.22 ohm, 1W
R451	24366563	CF, 56k ohm

Location No.	Part No.	Description
R452	24366561	CF, 560 ohm
R453	24366102	CF, 1k ohm
R454	24366332	CF, 3300 ohm
R455	24366561	CF, 560 ohm
R456	24366561	CF, 560 ohm
R457	24366561	CF, 560 ohm
R458	24366183	CF, 18k ohm
R459	24366333	CF, 33k ohm
R460	24366184	CF, 180k ohm
R461	24366333	CF, 33k ohm
R462	24366103	CF, 10k ohm
R463	24323689	MF, 6.8 ohm, 2W
R464	24366222	CF, 2200 ohm
R465	24366222	CF, 2200 ohm
R466	24366101	CF, 100 ohm
R470	24338568	MF, 0.56 ohm, 1W
R471	24552101	OMF, 100 ohm, 1/2W
R472	24376393	CF, 39k ohm, 1/2W
R474	24366331	CF, 330 ohm
R475	24366102	CF, 1k ohm
R477	24366153	CF, 15k ohm
R511	24000527	MF, 5600 ohm, 1/4W
R523	24366333	CF, 33k ohm
R533	24366681	CF, 680 ohm
R534	24366101	CF, 100 ohm
R535	24366391	CF, 390 ohm
R536	24366103	CF, 10k ohm
R537	24366681	CF, 680 ohm
R538	24366391	CF, 390 ohm
R539	24366681	CF, 680 ohm
R541	24366102	CF, 1k ohm
R542	24366221	CF, 220 ohm
R543	24366102	CF, 1k ohm
R544	24366101	CF, 100 ohm
R547	24366102	CF, 1k ohm
R548	24366102	CF, 1k ohm
R549	24366102	CF, 1k ohm
R565	24366470	CF, 47 ohm
R566	24366470	CF, 47 ohm
R567	24366470	CF, 47 ohm
R568	24366102	CF, 1k ohm
R570	24366122	CF, 1200 ohm
R571	24366122	CF, 1200 ohm
R572	24366122	CF, 1200 ohm
R581	24366391	CF, 390 ohm
R591	24383153	OMF, 15k ohm, 2W
R592	24383153	OMF, 15k ohm, 2W
R593	24383153	OMF, 15k ohm, 2W
R601	24366103	CF, 10k ohm
R602	24366103	CF, 10k ohm
R603	24366103	CF, 10k ohm
R633	24366229	CF, 2.2 ohm
R634	24366229	CF, 2.2 ohm
R641	24366103	CF, 10k ohm
R642	24366101	CF, 100 ohm
R643	24552331	OMF, 330 ohm, 1/2W
R644	24552331	OMF, 330 ohm, 1/2W
R645	24366102	CF, 1k ohm
R646	24366102	CF, 1k ohm
R668	24366103	CF, 10k ohm
R670	24366242	CF, 2400 ohm
R673	24366222	CF, 2200 ohm
R674	24366102	CF, 1k ohm
R675	24366222	CF, 2200 ohm

Location No.	Part No.	Description
R676	24366224	CF, 220k ohm
R681	24366242	CF, 2400 ohm
R688	24366104	CF, 100k ohm
R689	24366103	CF, 10k ohm
⚠R801	24009954	Metal-Glazed Resistor, 2.2M ohm, 1/2W
R802	24384563	OMF, 56 kohm, 3W
⚠R808	24019128	PTC Thermistor, 18 ohm, AC276V
R811	24569339	Cement, 3.3 ohm, 10W
R812	24366393	CF, 39k ohm
R813	24382683	OMF, 68k ohm, 1W
R814	24366682	CF, 6800 ohm
R815	24366332	CF, 3300 ohm
R816	24366334	CF, 330k ohm
R817	24366334	CF, 330k ohm
R818	24321399	MF, 3.9 ohm, 1/2W
R819	24366472	CF, 4700 ohm
R820	24366101	CF, 100 ohm
R822	24552103	OMF, 10k ohm, 1/2W
R823	24552682	OMF, 6800 ohm, 1/2W
R825	24366681	CF, 680 ohm
R829	24366472	CF, 4700 ohm
R832	24321228	MF, 0.22 ohm, 1/2W
R842	24366681	CF, 680 ohm
R843	24366821	CF, 820 ohm
R848	24552332	OMF, 3300 ohm, 1/2W
R850	24568689	Cement, 6.8 ohm, 7W
R851	24019461	MF, 0.15 ohm, 2W
R852	24552100	OMF, 10 ohm, 1/2W
R860	24366681	CF, 680 ohm
R861	24366221	CF, 220 ohm
R863	24366102	CF, 1k ohm
R865	24366681	CF, 680 ohm
R866	24366471	CF, 470 ohm
R867	24366103	CF, 10k ohm
R868	24366472	CF, 4700 ohm
R869	24321339	MF, 3.3 ohm, 1/2W
R870	24382223	OMF, 22k ohm, 1W
R878	24531560	FR, 56 ohm, 1/2W
R879	24366472	CF, 4700 ohm
R884	24531120	FR, 12 ohm, 1/2W
R885	24366561	CF, 560 ohm
R893	24366103	CF, 10k ohm
⚠R899	24005015	Metal-Glazed Resistor, 8.2M ohm, 1W
R901	24552272	OMF, 2700 ohm, 1/2W
R902	24552272	OMF, 2700 ohm, 1/2W
R903	24552272	OMF, 2700 ohm, 1/2W
R4370	24366334	CF, 330k ohm
R4371	24366684	CF, 680k ohm
R4378	24366474	CF, 470k ohm
R4379	24366334	CF, 330k ohm
R4383	24366105	CF, 1M ohm
RA02	24366102	CF, 1k ohm
RA04	24366102	CF, 1k ohm
RA05	24366103	CF, 10k ohm
RA06	24366102	CF, 1k ohm
RA07	24366103	CF, 10k ohm
RA08	24366102	CF, 1k ohm
RA09	24366102	CF, 1k ohm
RA10	24366103	CF, 10k ohm
RA11	24366103	CF, 10k ohm
RA12	24366331	CF, 330 ohm

Location No.	Part No.	Description
RA13	24366102	CF, 1k ohm
RA14	24366331	CF, 330 ohm
RA15	24366103	CF, 10k ohm
RA16	24366331	CF, 330 ohm
RA18	24366273	CF, 27k ohm
RA20	24366103	CF, 10k ohm (28N03F/28N01F)
RA21	24366103	CF, 10k ohm (28N03F/28N01F)
RA22	24366472	CF, 4700 ohm (28N03F/28N01F)
RA23	24366751	CF, 750 ohm
RA24	24366751	CF, 750 ohm
RA25	24366751	CF, 750 ohm
RA26	24366471	CF, 470 ohm
RA27	24366102	CF, 1k ohm
RA28	24366102	CF, 1k ohm
RA29	24366103	CF, 10k ohm
RA29	24366104	CF, 100k ohm
RA30	24366102	CF, 1k ohm
RA30	24366103	CF, 10k ohm
RA31	24366473	CF, 47k ohm
RA32	24366331	CF, 330 ohm
RA33	24366472	CF, 4700 ohm
RA34	24366331	CF, 330 ohm
RA35	24366472	CF, 4700 ohm
RA36	24366472	CF, 4700 ohm
RA38	24366472	CF, 4700 ohm
RA45	24366391	CF, 390 ohm
RA46	24366391	CF, 390 ohm
RA97	24366272	CF, 2700 ohm
RA98	24366512	CF, 5100 ohm
RA99	24366113	CF, 11k ohm
RB01	24366182	CF, 1800 ohm
RB01	24366271	CF, 270 ohm
RB02	24366474	CF, 470k ohm
RB03	24366333	CF, 33k ohm
RB04	24366123	CF, 12k ohm
RB05	24366392	CF, 3900 ohm
RB06	24366392	CF, 3900 ohm
RB07	24366223	CF, 22k ohm
RB08	24366471	CF, 470 ohm
RB09	24366103	CF, 10k ohm
RB09	24366470	CF, 47 ohm
RB10	24366272	CF, 2700 ohm
RF01	24366102	CF, 1k ohm
RF02	24366102	CF, 1k ohm
RF03	24366102	CF, 1k ohm
RR01	24366472	CF, 4700 ohm
RR02	24366472	CF, 4700 ohm
RR03	24366103	CF, 10k ohm
RR04	24366333	CF, 33k ohm
RR05	24366103	CF, 10k ohm
RR06	24366182	CF, 1800 ohm
RR07	24366271	CF, 270 ohm
RR08	24366271	CF, 270 ohm
RR09	24366271	CF, 270 ohm
RR10	24366101	CF, 100 ohm
RR11	24366101	CF, 100 ohm
RR12	24366101	CF, 100 ohm
RV01	24366101	CF, 100 ohm
RV02	24366101	CF, 100 ohm
RV03	24366101	CF, 100 ohm
RV04	24366472	CF, 4700 ohm
RV05	24366472	CF, 4700 ohm
RV06	24366101	CF, 100 ohm
RV07	24366472	CF, 4700 ohm
RV08	24366101	CF, 100 ohm
RV09	24366472	CF, 4700 ohm
RV10	24366101	CF, 100 ohm
RV11	24366473	CF, 47k ohm
RV12	24366101	CF, 100 ohm
RV13	24366101	CF, 100 ohm
RV14	24366101	CF, 100 ohm
RV15	24366472	CF, 4700 ohm
RV16	24366472	CF, 4700 ohm
RV17	24366102	CF, 1k ohm
RV19	24366222	CF, 2200 ohm
RV20	24366104	CF, 100k ohm
RV21	24366104	CF, 100k ohm
RV22	24366223	CF, 22k ohm
RV23	24366822	CF, 8200 ohm
RV24	24366750	CF, 75 ohm
RV25	24366103	CF, 10k ohm
RV26	24366750	CF, 75 ohm
RV27	24366750	CF, 75 ohm
RV28	24552101	OMF, 100 ohm, 1/2W
RV29	24366271	CF, 270 ohm
RV30	24366101	CF, 100 ohm
RV31	24366102	CF, 1k ohm
RV32	24366102	CF, 1k ohm
RV33	24366102	CF, 1k ohm
RV34	24366104	CF, 100k ohm
RV35	24366104	CF, 100k ohm
RV36	24366104	CF, 100k ohm
RV37	24366104	CF, 100k ohm
RV38	24366750	CF, 75 ohm
RV39	24366750	CF, 75 ohm
RV40	24366822	CF, 8200 ohm
RV41	24366223	CF, 22k ohm
RV45	24366750	CF, 75 ohm
RV46	24366750	CF, 75 ohm
RV47	24366103	CF, 10k ohm
RV48	24366750	CF, 75 ohm
RV49	24366750	CF, 75 ohm
RV50	24366750	CF, 75 ohm
RV51	24366104	CF, 100k ohm
RV52	24366104	CF, 100k ohm
RV53	24366102	CF, 1k ohm
RV54	24366222	CF, 2200 ohm
RV55	24366102	CF, 1k ohm
RV57	24552101	OMF, 100 ohm, 1/2W
RV58	24366101	CF, 100 ohm
RV59	24366271	CF, 270 ohm
RV60	24366561	CF, 560 ohm (28N03B)
RV61	24366561	CF, 560 ohm (28N03B)
RV62	24366104	CF, 100k ohm (28N03B)
RV63	24366104	CF, 100k ohm (28N03B)
RV64	24366104	CF, 100k ohm (28N03B)
RW01	24366681	CF, 680 ohm
RW02	24366681	CF, 680 ohm

COILS & TRANSFORMERS

L101	23238562	Coil, Peaking, TRF4109AJ
L102	23238560	Coil, Peaking, TRF4R68AJ
L103	23238554	Coil, Peaking, TRF4R22AJ
L104	23221803	Coil, Choke, TLN3040D
L130	23238712	Coil, Peaking, TRF4150AJ (28N03F/28N01F)
L134	23289100	Coil, Peaking, TRF4100AF

Location No.	Part No.	Description
L161	23262296	Coil, IF, TRF1244AV
L183	23289120	Coil, Peaking, TRF4120AF
L211	23289101	Coil, Peaking, TRF4101AF
L301	23103859	Coil (Ferrite Bead), TEM2011
L410	23103859	Coil (Ferrite Bead), TEM2011
L441	23233971	Coil, Linearity, TLN2144BG
L442	23248117	Coil, Choke, TLN3382D
L443	23221684	Coil, Choke, TLN3191D
L449	23103859	Coil (Ferrite Bead), TEM2011
L461	23221896	Coil, Choke, TLN3061
L491	23248116	Coil, Choke, TLN3368D
L511	23289100	Coil, Peaking, TRF4100AF
L525	23289100	Coil, Peaking, TRF4100AF
L590	23289100	Coil, Peaking, TRF4100AF
L643	23103859	Coil (Ferrite Bead), TEM2011
L802	23103880	Coil (Ferrite Bead), TEM2011Y
L803	23248213	Coil, Choke, TLN3481AH
L804	23248213	Coil, Choke, TLN3481AH
L811	23103859	Coil (Ferrite Bead), TEM2011
L821	23280016	Coil, Peaking, TRF4100AZ
L823	23221747	Coil, Choke, TRF9253D
L826	23248073	Coil, Choke, TLN3299D
L829	23103859	Coil (Ferrite Bead), TEM2011
L842	23103859	Coil (Ferrite Bead), TEM2011
L860	23289229	Coil, Peaking, TRF42R2AF
L861	23289100	Coil, Peaking, TRF4100AF
L880	23280016	Coil, Peaking, TRF4100AZ
⚠L901	23200276	Coil, Degaussing, TSB-2330BR
L4370	23289101	Coil, Peaking, TRF4101AF
LA02	23103859	Coil (Ferrite Bead), TEM2011
LA03	23289109	Coil, Peaking, TRF41R0AF
LA04	23103859	Coil (Ferrite Bead), TEM2011
LA39	23103859	Coil (Ferrite Bead), TEM2011
T401	23224373	Transformer, Horiz, Drive, TLN1100AM
⚠T461	23236596	Transformer, Flyback, TFB4117BE
⚠T801	23211727	Line Filter, TRF3230AM
⚠T863	23217464	Transformer, Converter, TPW3448AM

SEMICONDUCTORS

Q101	A6002060	Transistor, RN1206 (28N03F/28N01F)
Q102	A6002060	Transistor, RN1206 (28N03F/28N01F)
Q104	A6708871	Transistor, 2SC388ATM
Q106	A6002060	Transistor, RN1206 (28N03F/28N01F)
Q107	A6708871	Transistor, 2SC388ATM
Q130	23314794	Transistor, 2PC1815Y (28N03F/28N01F)
Q131	23114528	Transistor, 2SC1740S, Q
Q132	23314791	Transistor, 2PA1015Y
Q200	A6330059	Transistor, 2SC2482(C)
Q301	B0378560	IC, TA8427K
Q301B	23035308	Screw, BTB3X8SZN
Q302	A6002010	Transistor, RN1201
Q370	23314791	Transistor, 2PA1015Y
Q402	A6330069	Transistor, 2CS2482 FA-1
Q404	A6873777	Transistor, 2SD2553
Q404B	23037312	Screw, BTBW3X12SZN
Q460	23314938	Transistor, 2SD2493(P)
Q460B	23035310	Screw, BTB3X10SZN

Location No.	Part No.	Description
Q461	23314791	Transistor, 2PA1015Y
Q462	23314791	Transistor, 2PA1015Y
Q463	23314791	Transistor, 2PA1015Y
Q465	23114528	Transistor, 2SC1740S, Q
Q470	A6547250	Transistor, 2SA1320
Q505	A6363200	Transistor, 2CS3619
Q506	23314794	Transistor, 2PC1815Y
Q507	A6363200	Transistor, 2CS3619
Q508	23314794	Transistor, 2PC1815Y
Q509	A6363200	Transistor, 2CS3619
Q510	23314794	Transistor, 2PC1815Y
Q514	A6509120	Transistor, 2SA562TM-O
Q516	A6321240	Transistor, 2SC2120-Y
Q601	A6342200	Transistor, 2CS2878-A
Q602	A6342200	Transistor, 2CS2878-A
Q603	A6010040	Transistor, RN2004
Q604	23314791	Transistor, 2PA1015Y
Q608	B01A0068	IC, TA8265K
Q608B	23037310	Screw, BTB3X10SZN
Q671	A6342200	Transistor, 2CS2878-A
Q673	A6342200	Transistor, 2CS2878-A
Q801	23135010	IC, STR-G6653
Q801B	23037310	Screw, BTB3X10SZN
Q802	23314141	Transistor, 2SC3852
⚠Q826	A8643108	Photo Coupler, TLP621(GR-LF
⚠Q827	A6907891	IC, S1854A(FA)
Q828	23314794	Transistor, 2PC1815Y
⚠Q829	A8643108	Photo Coupler, TLP621(GR-LF
Q831	23314794	Transistor, 2PC1815Y
Q836	23314791	Transistor, 2PA1015Y
Q840	23318299	IC, L78MR05
Q861	23314141	Transistor, 2SC3852
Q870	23314141	Transistor, 2SC3852
Q871	23314794	Transistor, 2PC1815Y
Q890	23314141	Transistor, 2SC3852
QA01	23000362	IC, SAA5563PS
QA02	23905665	IC, AT24C08-10PC
QA03	A6333346	Transistor, 2SC2655-Y(C)
QA04	23314794	Transistor, 2PC1815Y
QA04	A6002060	Transistor, RN1206 (28N03F/28N01F)
QA05	23314794	Transistor, 2PC1815Y
QB01	23314791	Transistor, 2PA1015Y
QB02	23314794	Transistor, 2PC1815Y
QF01	23314794	Transistor, 2PC1815Y
QR01	70129053	IC, BA7603
QR02	A6734590	Transistor, 2SC752(G)TM-Y
QR03	23314794	Transistor, 2PC1815Y
QR04	A6002040	Transistor, RN1204
QR05	A6002040	Transistor, RN1204
QV01	B0385655	IC, TA1219N
QV02	23314794	Transistor, 2PC1815Y
QV03	23314791	Transistor, 2PA1015Y
QV04	23314794	Transistor, 2PC1815Y
QV05	23114623	Transistor, 2SC2878-A(TEM) (28N03B)
QV06	23114623	Transistor, 2SC2878-A(TEM) (28N03B)
QV07	23114478	Transistor, RN2004 (28N03B)
QV11	23314791	Transistor, 2PA1015Y
D101	23115599	Diode, 1N4148 (28N03F/28N01F)
D102	23115636	Diode, 1SS110 (28N03F/28N01F)

Location No.	Part No.	Description
D110	23115636	Diode, 1SS110 (28N03F/28N01F)
D120	23316653	Diode, Zener, MTZJ2.7B (28N03F/28N01F)
D190	23316756	Diode, Zener, MTZJ33D T77
D224	23115599	Diode, 1N4148
D240	23316553	Diode, 1SS145
D301	23118479	Diode, BYD33J
D302	23118479	Diode, BYD33J
D303	23316794	Diode, SC570ALFE2
D308	23118479	Diode, BYD33J
D309	23118479	Diode, BYD33J
D401	23316685	Diode, Zener, MTZJ8.2C T77
D406	23118479	Diode, BYD33J
D408	23118479	Diode, BYD33J
D422	23316743	Diode, Zener, MTZJ24C T72
D441	23316688	Diode, Zener, MTZJ9.1C T72
D450	23316648	Diode, Zener, MTZJ2.2A T72
D461	23316582	Diode, ERC20-06
D461B	23035306	Screw, BTB 3X6 SZN
D467	23118479	Diode, BYD33J
D471	A7801205	SCR, SF0R3G42(N,G5H1)
D474	23316728	Diode, Zener, MTZJ16B T72
D475	23316719	Diode, Zener, MTZJ12B
D590	23115599	Diode, 1N4148
D591	23115599	Diode, 1N4148
D592	23115599	Diode, 1N4148
D594	23115599	Diode, 1N4148
D595	23115599	Diode, 1N4148
D596	23115599	Diode, 1N4148
D597	23115599	Diode, 1N4148
D598	23115599	Diode, 1N4148
D599	23115599	Diode, 1N4148
D602	23115599	Diode, 1N4148
D603	23115599	Diode, 1N4148
D636	23115599	Diode, 1N4148
D637	23115599	Diode, 1N4148
D638	23115599	Diode, 1N4148
D639	23115599	Diode, 1N4148
D801	23316391	Diode, D3SB60, 4109
D802	23316381	Diode, RU1P LF-C1
D803	23316678	Diode, Zener, MTZJ6.8B T72
D804	23316725	Diode, Zener, MTZJ15B T72
D805	23316553	Diode, 1SS145
D806	23118479	Diode, BYD33J
D809	23316672	Diode, Zener, MTZJ5.6B T72
D810	23316738	Diode, Zener, MTZJ22B T72
D811	23115599	Diode, 1N4148
D812	23115599	Diode, 1N4148
D813	23118479	Diode, BYD33J
D814	23115599	Diode, 1N4148
D815	23316746	Diode, Zener, MTZJ27B T72
D816	23316746	Diode, Zener, MTZJ27B T72
D817	23115599	Diode, 1N4148
D818	23316738	Diode, Zener, MTZJ22B T72
D825	23115599	Diode, 1N4148
D826	23115599	Diode, 1N4148
D830	23118479	Diode, BYD33J
D831	23118052	Diode, RU4Z LF-L1
D832	23118451	Diode, RU-4A LF-L1
D844	23316718	Diode, Zener, MTZJ12A T72
D848	23316666	Diode, Zener, MTZJ4.7B
D861	23316673	Diode, Zener, MTZJ5.6C
D862	23316674	Diode, Zener, MTZJ6.2A T77
D863	23316667	Diode, Zener, MTZJ4.7C
D865	23115599	Diode, 1N4148
D874	23316670	Diode, Zener, MTZJ5.1C T72
D875	23115599	Diode, 1N4148
D878	23316671	Diode, Zener, MTZJ5.6A T72
D879	23115599	Diode, 1N4148
D4371	23115599	Diode, 1N4148
DA02	23115599	Diode, 1N4148
DA03	23115599	Diode, 1N4148
DA04	23115599	Diode, 1N4148
DA05	23115599	Diode, 1N4148
DA06	23316675	Diode, Zener, MTZJ6.2B T77
DA07	23316661	Diode, Zener, MTZJ3.9B N77
DA30	23316687	Diode, Zener, MTZJ9.1B T72
DB01	23358504	Diode (LED), SCL003URC3FX
DR06	23115599	Diode, 1N4148
DV01	23316690	Diode, Zener, MTZJ10B T77
DV02	23316690	Diode, Zener, MTZJ10B T77
DV03	23316690	Diode, Zener, MTZJ10B T77
DV04	23316690	Diode, Zener, MTZJ10B T77
DV05	23316687	Diode, Zener, MTZJ9.1B T77
DV06	23115599	Diode, 1N4148

MISCELLANEOUS

B221	23037312	Screw, BTBW 3X12 SZN
⚠F801	23144507	Fuse, 3.15A, 250V
F801A	23165433	Holder, Fuse
⚠F803	23144502	Fuse, 1.0A, 250V
F803A	23165433	Holder, Fuse
G101	24366123	CF, 12k ohm (28N03F/28N01F)
G103	24366820	CF, 82 ohm
G105	24366562	CF, 5600 ohm (28N03F/28N03D/28N01F)
G108	23238562	Coil, Peaking, TRF4109AJ
G109	23238562	Coil, Peaking, TRF4109AJ
G110	23238562	Coil, Peaking, TRF4109AJ
G111	23238714	Coil, Peaking, TRF4100AJ
G112	23238714	Coil, Peaking, TRF4100AJ
G113	23115636	Diode, 1SS110, TE (28N03F/28N01F)
G114	23238506	Coil, Peaking, TRF4229AJ
G131	24366221	CF, 220 ohm
G410	24693472	PF, 4700pF, 100V
G444	24338398	MF, 0.39 ohm, 1W
G591	23289100	Coil, Peaking, TRF4100AF
G800	24366470	CF, 47 ohm
G801	23316667	Diode, Zener, MTZJ4.7C
G810	23103859	Coil (Ferrite Bead), TEM2011
G920	24000874	FR, 4.3 ohm, 1W
GA29	24366102	CF, 1k ohm
GA41	24366103	CF, 10k ohm
GA42	24366103	CF, 10k ohm
GV01	23238714	Coil, Peaking, TRF4100AJ
GV02	24366681	CF, 680 ohm
GV03	23238714	Coil, Peaking, TRF4100AJ
GV06	23238714	Coil, Peaking, TRF4100AJ
GV07	24366681	CF, 680 ohm
GV08	24366681	CF, 680 ohm
GV09	23238714	Coil, Peaking, TRF4100AJ
GV11	24366681	CF, 680 ohm
GV18	23238714	Coil, Peaking, TRF4100AJ
GV88	24366681	CF, 680 ohm
GV89	24366681	CF, 680 ohm

Location No.	Part No.	Description
H005	23148352	Module, MPSN11A, NICAM/IGR A-PRO
KB01	23904946	Remote Sensor, RPM-676CBR-S
P410B	23903022	Socket, 8P
P411B	23903022	Socket, 8P
P412B	23903022	Socket, 8P
P413B	23903022	Socket, 8P
P414B	23903022	Socket, 8P
P681	23363607	Jack, Headphone
⚠P801	23372052	Power Cord (28N03F/28N03D/28N01F)
⚠P801	23372012	Power Cord (28N03B)
PH01	23365598	Connector, 21 Pin
PH02	23365598	Connector, 21 Pin
PH20	23363252	Jack, 1P Phono(Yel)
PH21	23365508	Jack, Phono, 2P
S801	23344416	Switch, Power
SA01	23145563	Switch, Push, 1C1P
SA02	23145563	Switch, Push, 1C1P
SA03	23145563	Switch, Push, 1C1P
SA04	23145563	Switch, Push, 1C1P
SA05	23145563	Switch, Push, 1C1P
SR82	23146573	Relay, DC12V
⚠V901A	23902891	Socket, CRT, 10P
W661	23351107	Speaker, SPK-1374, 60X120mm, 8 ohm
W662	23351107	Speaker, SPK-1374, 60X120mm, 8 ohm
X501	23153979	Crystal, 4.43MHz
XA01	23153930	Crystal, 12.0MHz
Z101	23303231	Filter, 38MHZ, K3953M
Z102	23303232	Filter, 38MHZ, K9453M (28N03F/28N01F)
Z102	23303237	Filter, 38MHZ, K9353M (28N03B)
Z103	23303189	Ceramic Trap, TCF1114 (28N03F/28N01F)
Z103	23107926	Ceramic Video Trap, 5.5MHz, TCF1012 (28N03B)
Z103	23107927	Ceramic Video Trap, 5.5MHz, TCF1011 (28N03D)
Z104	23303072	Ceramic Filter, 6.5MHz, TCF1089
Z902	23103839	Ferrite Core, TFE1012
⚠ZP81	23144543	Protector, PRF50005491, 125V, 5A
⚠ZP82	23144540	Protector, PRF20005491, 125V, 2A
ZP83	23144536	Protector, PRF10005491, 125V, 1A

PC BOARD ASSEMBLIES

* U901	23784568	CRT Drive Board, PB7318A (28N03F/28N01F)
* U901	23784913	CRT Drive Board, PB7318B (28N03B)
* U901	23785045	CRT Drive Board, PB7318C (28N03D)
* U902A	23784548	Signal Board, PB9480A (28N03F/28N01F)
* U902A	23784911	Signal Board, PB9480B (28N03B)
* U902A	23785047	Signal Board, PB9480C (28N03D)
* U903	23708013	Power/DEF Board, PB9481A (28N03F/28N01F)
* U903	23784912	Power/DEF Board, PB9481B (28N03B)
* U903	23785046	Power/DEF Board, PB9481C (28N03D)

PICTURE TUBE

⚠V901	23312857	Picture Tube, A68EAK071X03

TUNER

H001	23321370	Tuner, EGA51L (28N03F/28N03D/28N01F)
H001	23321372	Tuner, UF831L (28N03B)

ACCESSORIES

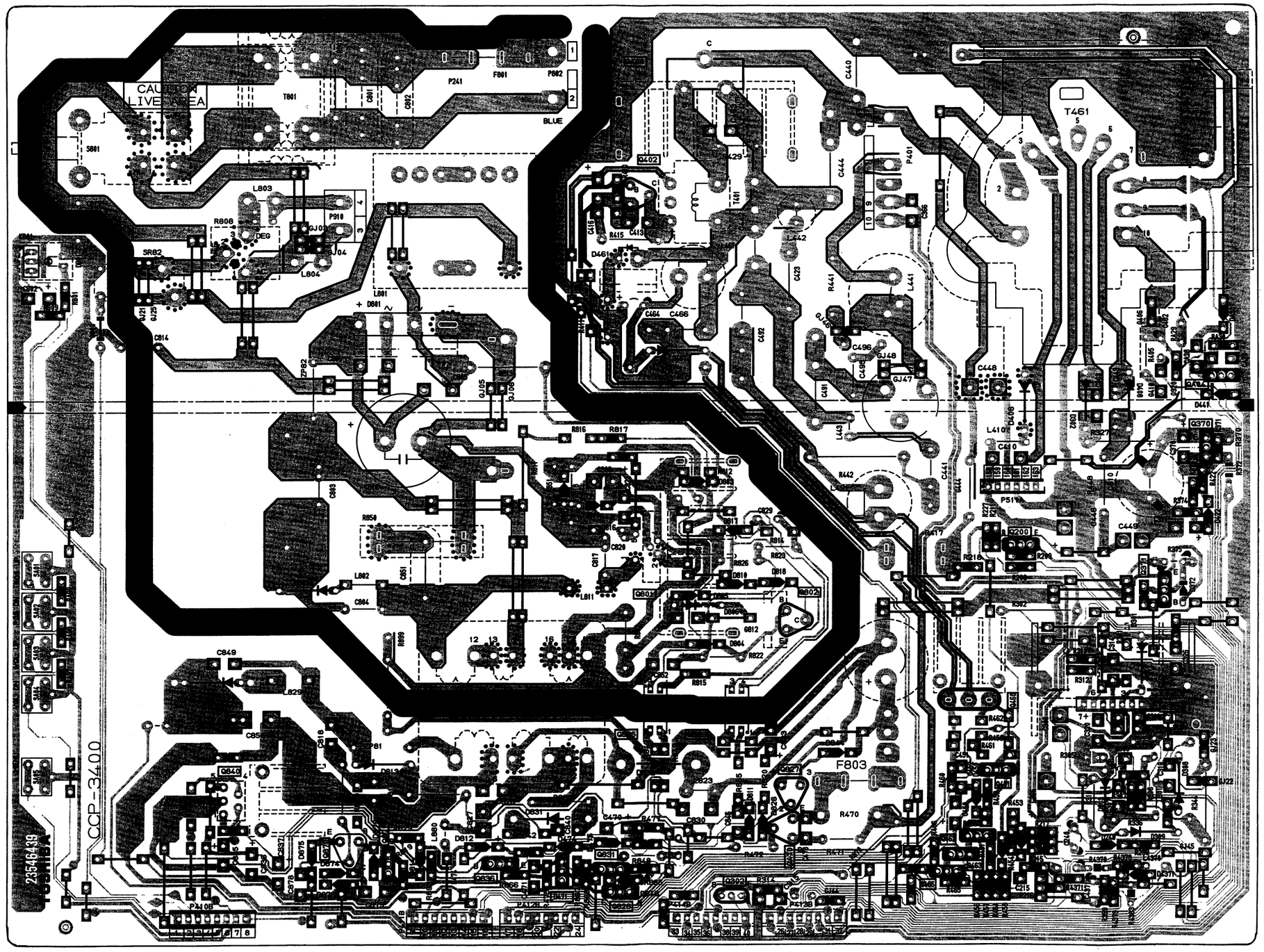
K902	23306363	Remote Hand Unit, CT-90040
AT03	23	Battery Cover
Y101	23563901	Owner's Manual, French, 28N03F/28N01F
Y101	23563937	Owner's Manual, English, 28N03B
Y101	23563902	Owner's Manual, German, 28N03D
Y102	23563902	Owner's Manual, German, 28N03F/28N01F
Y102	23563904	Owner's Manual, Itarian, 28N03D
Y103	23563903	Owner's Manual, Spanish, 28N03F/28N01F
Y104	23563904	Owner's Manual, Itarian, 28N03F/28N01F

CABINET PARTS

A201S	23549977	Front Cover
A214	23035412	Screw, BTB4X12SZN
A231	23445394	Button, Power
A235	23432984	Mark
A241	70368125	Push Catch for Door
A242	23427817	Door
⚠A401	23549976	Back Cover
A701	23064191	Carton
A702	23946015	Packing, Bottom
A703	23946014	Packing, Top

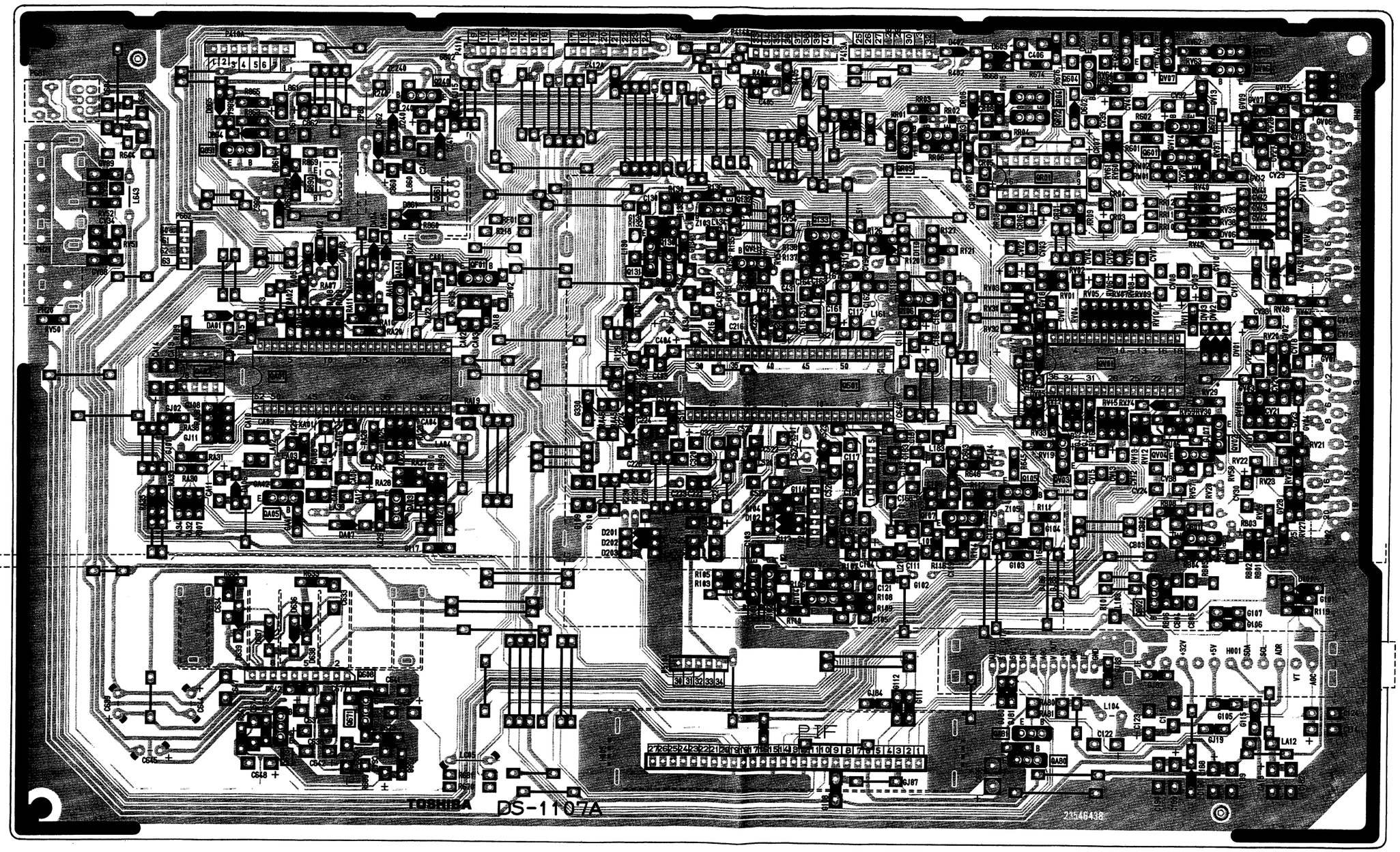
POWER/DEF BOARD PB9481

BOTTOM (FOIL) SIDE



SIGNAL BOARD PB9480

BOTTOM (FOIL) SIDE



SCHEMATIC DIAGRAM MODEL : 28N03F / 28N03B (1/2)
28N03D / 28N01F

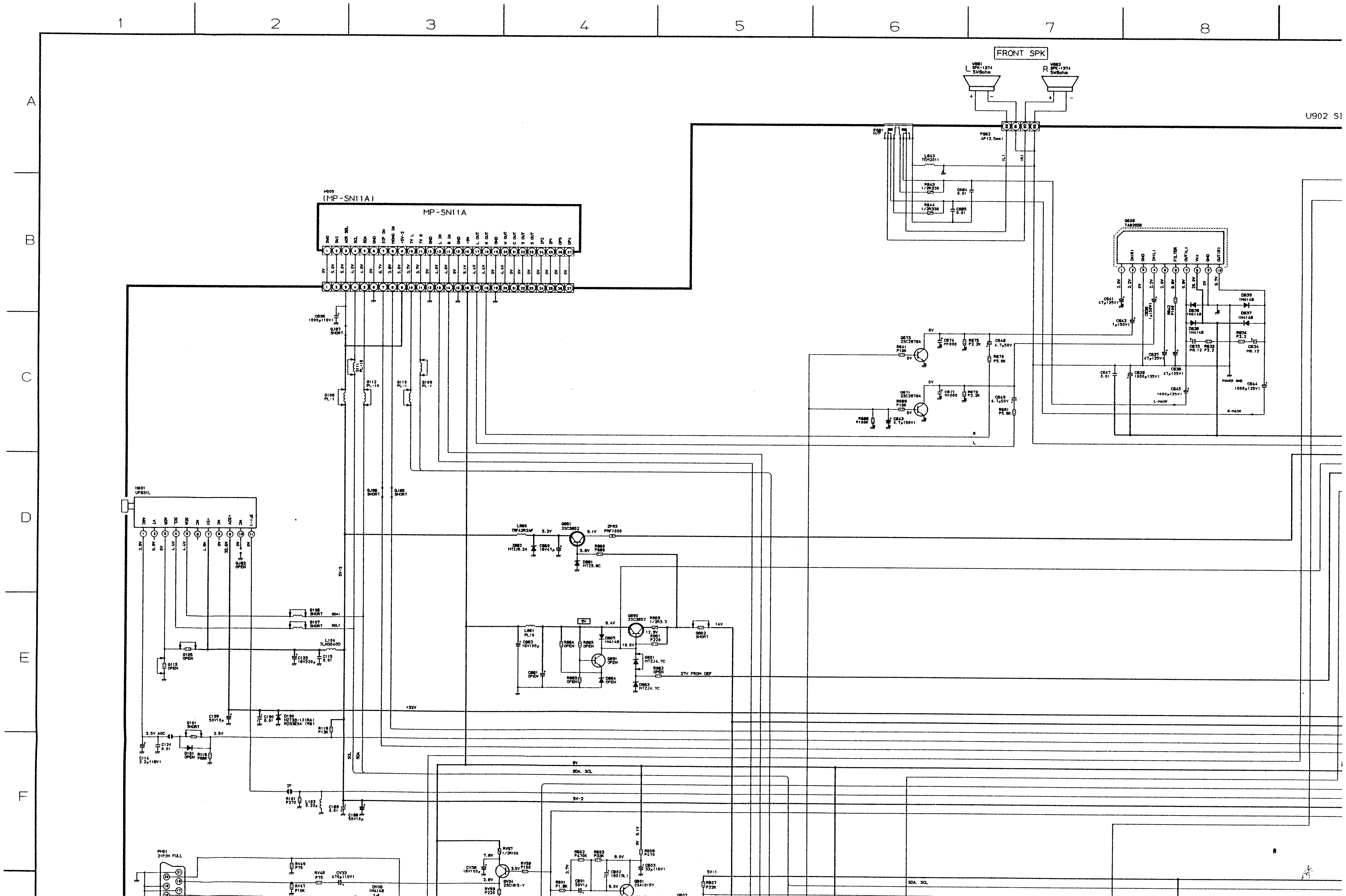
CAUTION: The international hazard symbols "⚠" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 3. Do not degrade the safety of the receiver through improper servicing.

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltages read with VTVM from point shown to chassis ground, line voltage 220 volts, colour bar signal. Voltages reading may vary ±20%.
2. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
3. Waveforms are taken using a standard colour bar signal.
4. Make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position. Set other controls for best picture.

NOTES:

1. D.C. resistance value of a pri
gram. These are measured for
2. The circuits are subject to cha
3. ⬬ : Solder links.



21	SHIELD EARTH
20	VIDEO IN
19	VIDEO OUT
18	RAPID BLK EARTH
17	VIDEO EARTH
16	RAPID BLANKING
15	RED IN
14	EARTH
13	RED EARTH
12	NC
11	GREEN IN
10	NC
9	GREEN EARTH
8	EXT/TV
7	BLUE IN
6	AUDIO IN (L)
5	BLUE EARTH
4	AUDIO EARTH
3	AUDIO OUT (L)
2	AUDIO IN (R)
1	AUDIO OUT (R)

21	SHIELD EARTH
20	S-VIDEO/Y
19	VIDEO OUT
18	EARTH
17	VIDEO EARTH
16	NC
15	S-VIDEO/C
14	EARTH
13	EARTH
12	NC
11	NC
10	NC
9	EARTH
8	EXT/TV
7	NC
6	AUDIO IN (L)
5	EARTH
4	AUDIO EARTH
3	AUDIO OUT (L)
2	AUDIO IN (R)
1	AUDIO OUT (R)

NOTES:

1. D.C. resistance value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3. ⬬ : Solder links.

EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

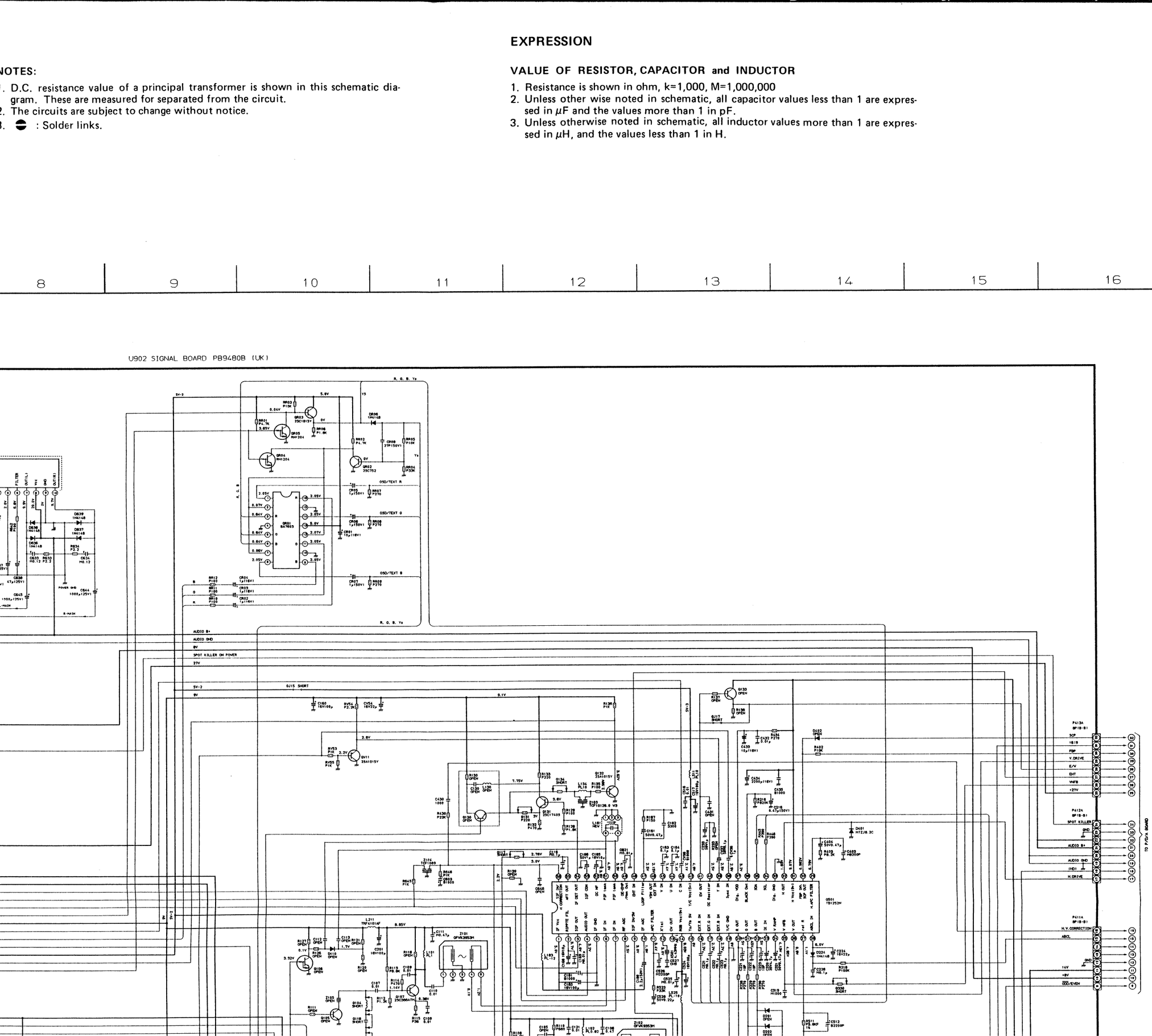
1. Resistance is shown in ohm, k=1,000, M=1,000,000
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in μF and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH, and the values less than 1 in H.

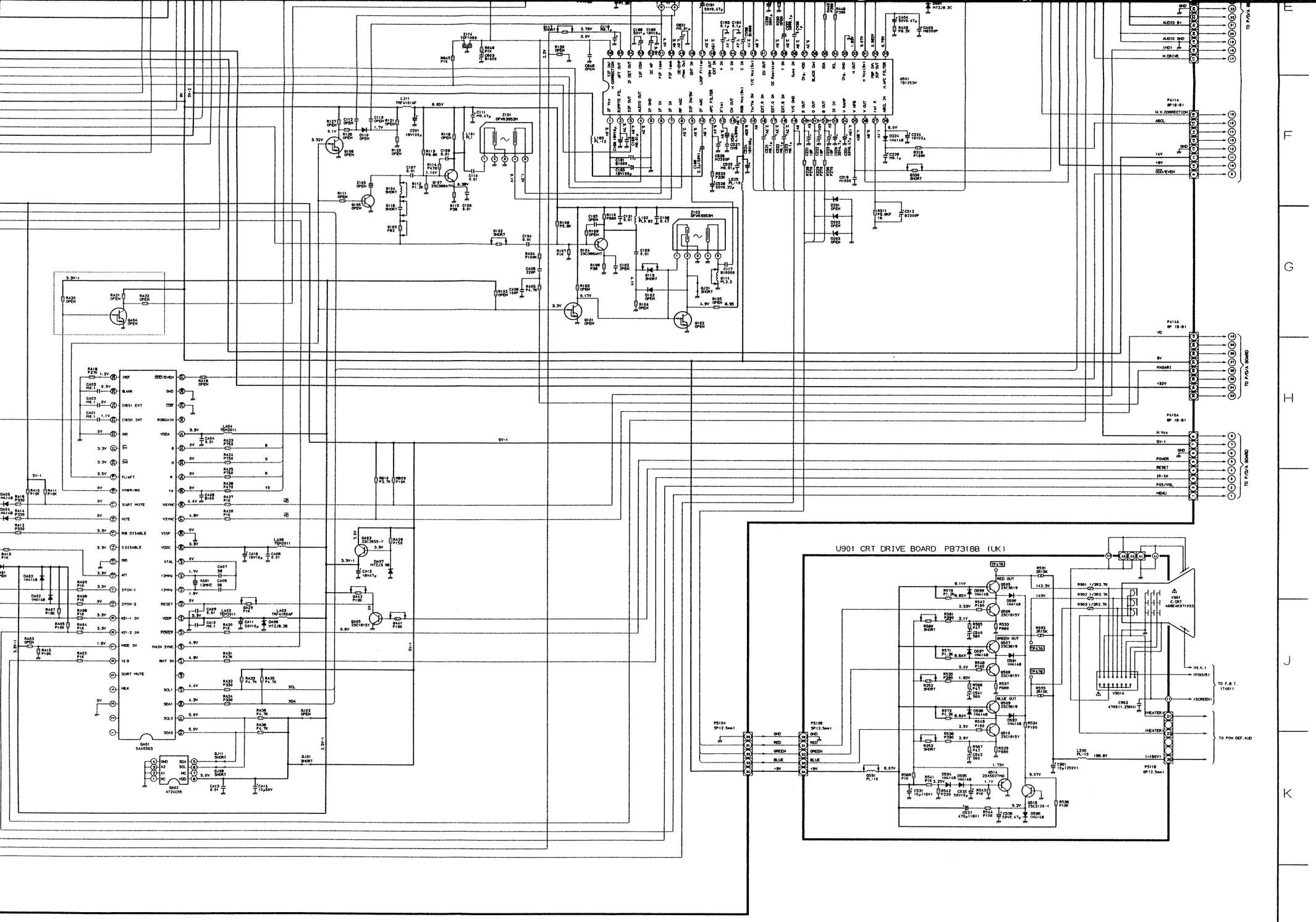
12

8 9 10 11 12 13 14 15 16

A B C D E F

U902 SIGNAL BOARD PB9480B (UK)




U901 CRT DRIVE BOARD PB7318B (UK)
28N03 Series
SIGNAL & CRT BOARD
PK3196
TO P/DA BOARD
TO F.B.T. (T4611)
TO POW. DEF. AUD
E
F
G
H
J
K
L
8
9
10
11
12
13
14
15
16

SCHEMATIC DIAGRAM MODEL : 28N03F / 28N03B (2/2)
28N03D / 28N01F

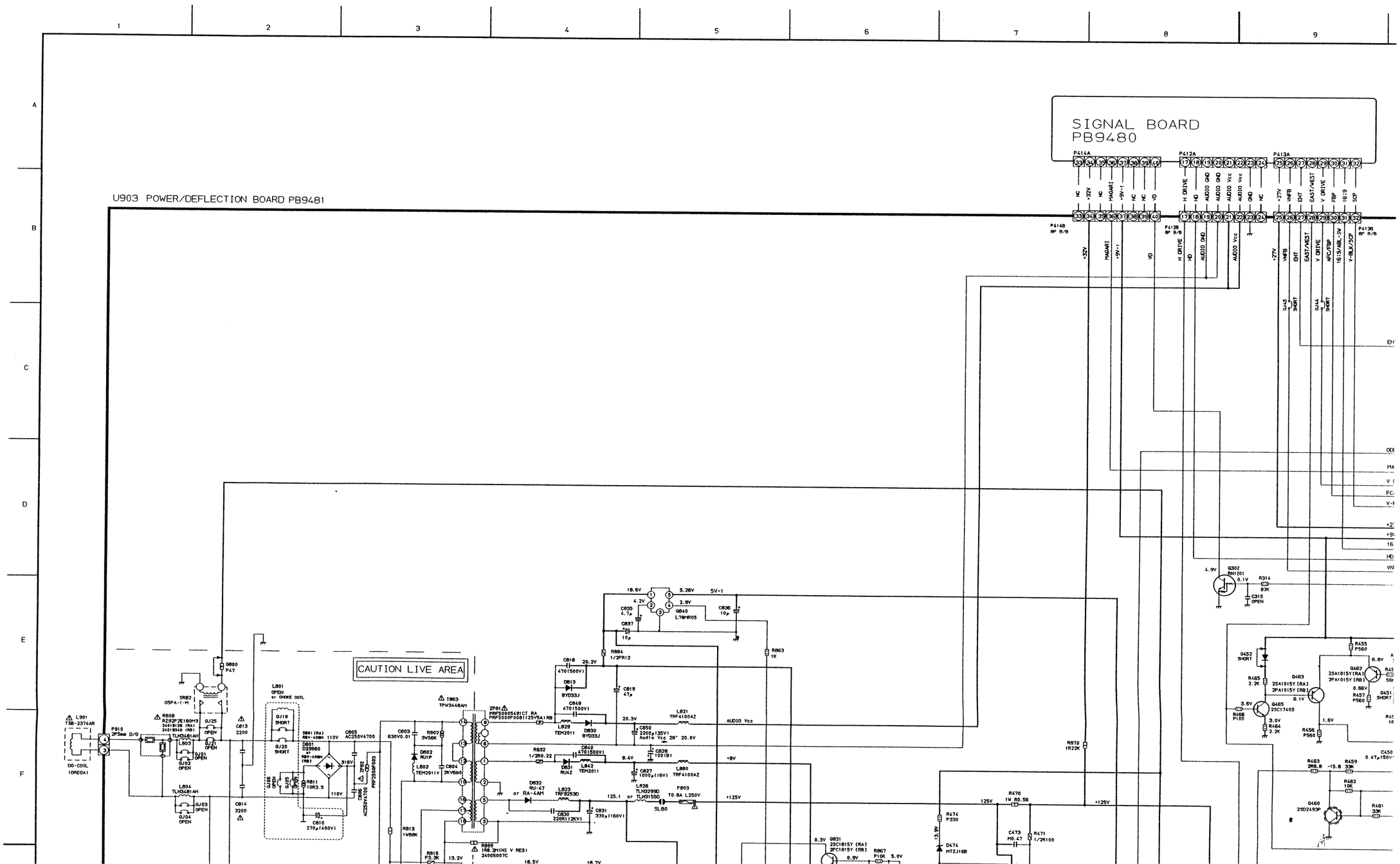
CAUTION: The international hazard symbols "⚠" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 3. Do not degrade the safety of the receiver through improper servicing.

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltages read with VTVM from point shown to chassis ground, line voltage 220 volts, colour bar signal. Voltages reading may vary ±20%.
2. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
3. Waveforms are taken using a standard colour bar signal.
4. Make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position. Set other controls for best picture.

NOTES:

1. D.C. resistance value of a principal transforme gram. These are measured for separated from th
2. The circuits are subject to change without notic
3. ● : Solder links.



CAUTION LIVE AREA

SIGNAL BOARD
PB9480

C801/C802
RA:24503055B
RB:24503057B

1166

YEAR 2000 POWER REGULATION CHANGE
L801 CHOKE COIL
T801 TRF3218AM
SJ19 OPEN
SJ20 OPEN

AUDIO Vcc
+8V
+125V
5V-1
ODD/EVEN
+14V
H DRIVE
DPC

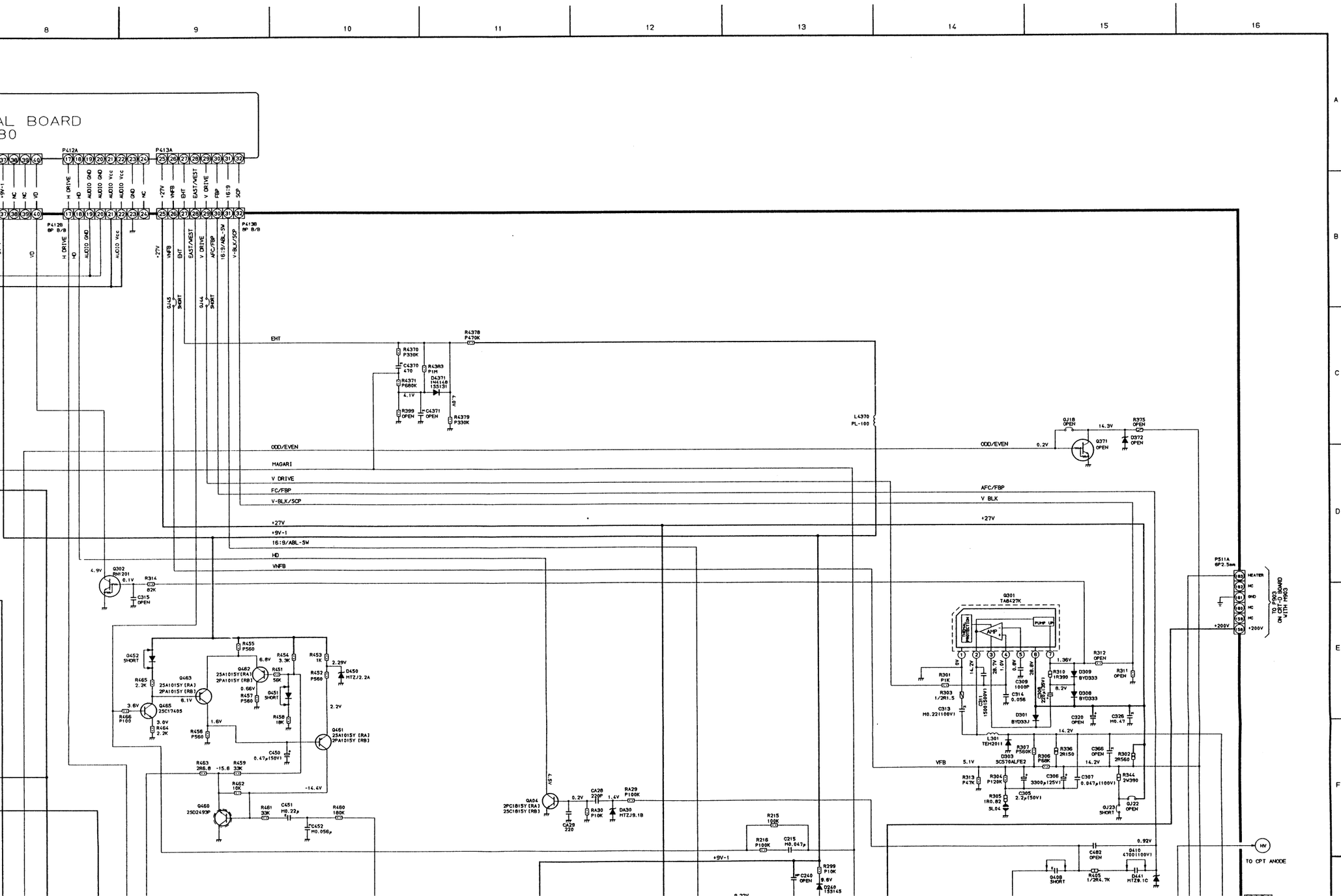
NOTES:

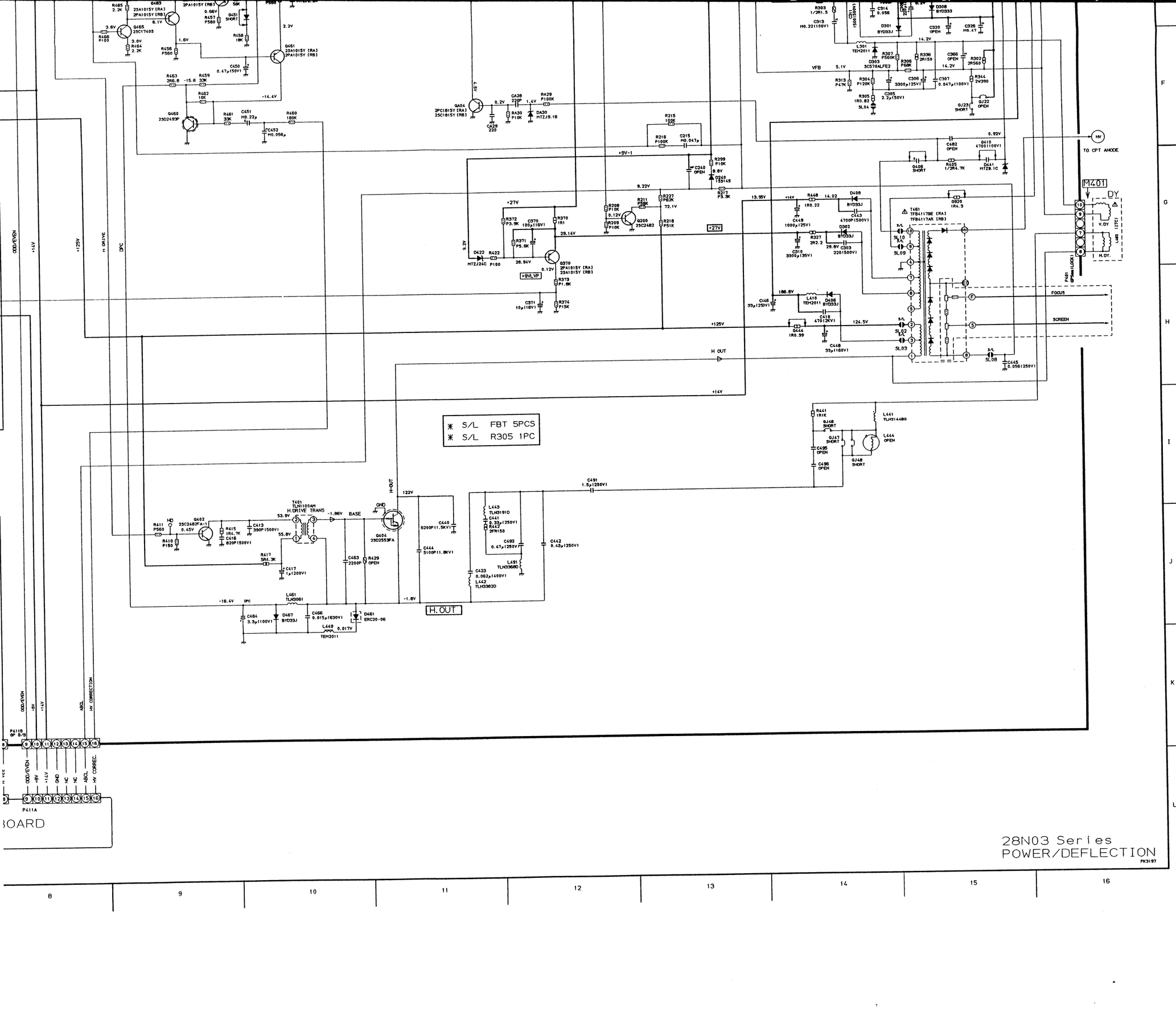
1. D.C. resistance value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3. ⬬ : Solder links.

EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

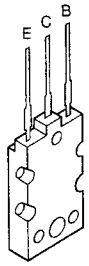
1. Resistance is shown in ohm, k=1,000, M=1,000,000
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in μF and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH, and the values less than 1 in H.



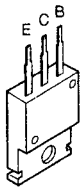

Q483
2SA1015Y [RA]
2PA1015Y [RB]
Q465
2SC1740S
Q461
2SA1015Y [RA]
2PA1015Y [RB]
Q460
2SD2493P
Q451
SHORT
R465 2.2K
R466 P100
R464 2.2K
R456 P560
R457 P560
R458 18K
R459 33K
R462 10K
R463 2R6.8
R461 33K
C451 H0.22μ
C452 H0.056μ
C450 0.47μ(50V)
3.6V
8.1V
3.0V
1.6V
2.2V
-15.6
-14.4V
Q404
2SC1815Y [RA]
2SC1815Y [RB]
C428 220P
C429 220
R430 P10K
R429 P100K
DA30 HTZJ5.1B
0.2V
1.4V
5.6V
R215 100K
R216 P100K
C215 H0.047μ
+9V-1
C240 OPEN
R299 P10K
D240 1SS145
9.8V
R217 P3.3K
9.22V
+27V
R372 P3.9K
C370 100μ(16V)
R370 1R1
R371 P5.6K
29.14V
D422 HTZJ24C
R422 P100
28.94V
Q370 2PA1015Y [RA] 2SA1015Y [RB]
0.12V
+9VLVP
R373 P1.8K
C371 10μ(16V)
R374 P15K
9.2V
R200 P10K
R209 P10K
Q200 2SC2482
R211 P82K
R227 P82K
R218 P51K
72.1V
5.12V
+27V
+125V
H OUT
+14V
R303 1/2R1.5
C313 H0.22(100V)
C314 0.056
D308 BYD333
D301 BYD33J
C320 OPEN
C326 H0.47
L301 TEH2011
D303 5C570ALFE2
R307 P560K
R306 P68K
R336 2R150
C366 OPEN
R302 2R560
14.2V
VFB
5.1V
R312 P47K
R304 P120K
C306 3300μ(25V)
C307 0.047μ(100V)
R344 2W390
R305 1R0.82
SL04
C305 2.2μ(50V)
GJ23 SHORT
GJ22 OPEN
0.92V
C462 OPEN
Q410 4700(100V)
D408 SHORT
R405 1/2W4.7K
D461 HTZ9.1C
HV
TO CPT ANODE
M401
DY
V.DY
H.DY.
LABEL (ITC)
P401 6P Conn (LOCK)
FOCUS
SCREEN
T461 TFB4117BE [RA] TFB4117AR [RB]
D408 BYD33J
C430 4700P(500V)
D302 BYD33J
C303 2201(500V)
R448 1R0.22
C449 1000μ(25V)
R327 2R2.2
C310 3300μ(35V)
13.95V
29.8V
C448 33μ(160V)
C446 33μ(250V)
L410 TEH2011
D406 BYD33J
C410 470(2KV)
R444 1R0.39
124.5V
SL02
SL03
SL08
SL09
SL10
C445 0.056(250V)
* S/L FBT 5PCS
* S/L R305 1PC
R441 1R1K
GJ46 SHORT
GJ47 SHORT
GJ48 SHORT
C495 OPEN
C496 OPEN
L441 TLN2144B0
L444 OPEN
C491 1.5μ(250V)
122V
H-OUT
T401 TLN1100AM H.DRIVE TRANS
53.9V
55.6V
-1.86V
BASE
GND
Q404 2SD2553FA
Q402 2SC2482FA-1
0.45V
R411 P560
R410 P150
R415 1R4.7K
C416 820P(500V)
C413 390P(500V)
R417 5R4.3K
C417 1μ(200V)
C463 2200P
R429 OPEN
C440 6200P(1.5KV)
C444 5100P(1.8KV)
-1.6V
H.OUT
L443 TLN3191D
C441 0.33μ(250V)
R442 2FR150
C492 0.47μ(250V)
C442 0.43μ(250V)
L491 TLN3368D
C423 0.062μ(400V)
L442 TLN3362D
-16.4V
DFC
L461 TLN3061
C464 3.3μ(100V)
D467 BYD33J
C466 0.015μ(1630V)
L449 0.017V
TEH2011
D461 ERC20-06
P411B 8P B/B
P411A
ODD/EVEN
+8V
+11V
GND
NC
NC
ABCL
+V CORRECTION
BOARD
28N03 Series
POWER/DEFLECTION
PK3197
8
9
10
11
12
13
14
15
16
F
G
H
I
J
K
L

TERMINAL VIEW OF TRANSISTORS

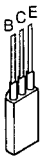
① 2SD2253
(old)
2SC5243



② 2SC3852
2SD1763A
2SC1569
2SC4544
2SA1788
2SA1306
2SA1186A

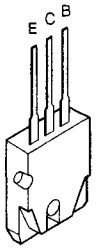


③ 2SC752GTM
2SC2482
2SC2655
2SC4721P

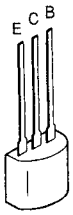


④ 2SC752
2SA562TM
2SA1015
2SC1815
2SC2878
2SC1740S
2SC2120
2SA9335

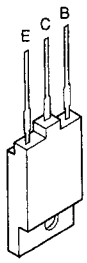
⑤ 2SA1788



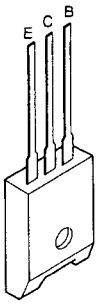
⑥ RN2203
RN2201
RN2004
RN1203
RN1204
RN2204
RN1205
RN1202
RN1201



⑦ 2SD1554
2SD2253
2SD1556
2SC5143
2SD2553

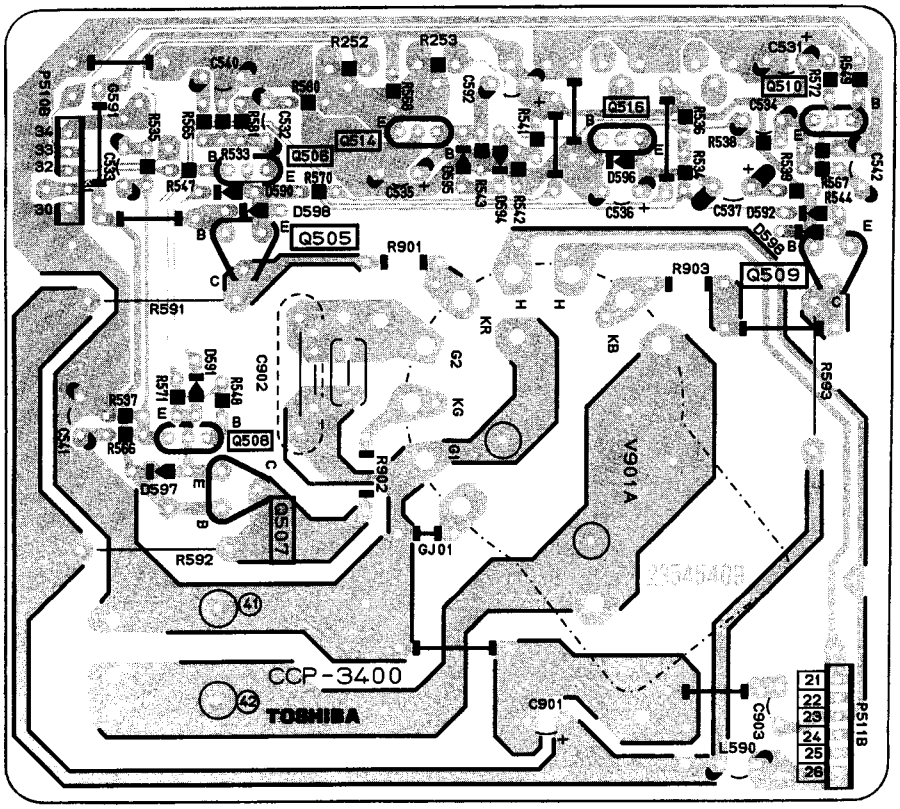


⑧ ON4409



CRT-D BOARD PB7318

BOTTOM (FOIL) SIDE



SPECIFICATIONS (Representative: 28N03F)

Input Power Rating: AC 220 ~ 240 Volts, 50 Hz, 100 W (Appro.)

Aerial Input Impedance: 75 ohm unbalanced type for VHF, UHF and CATV

Receiving Channels:

System		VHF	UHF	CATV	
PAL B/G	CCIR	2 ~ 12	21 ~ 69	S1 ~ S41	X ~ Z + 2,
SECAM B/G	CCIR	2 ~ 12	21 ~ 69	S1 ~ S41	X ~ Z + 2,
PAL D/K	CHINA	1 ~ 12	13 ~ 57	Z1 ~ S35	
SECAM D/K	OIRT	1 ~ 12	21 ~ 69	X1 ~ X19	
PAL I	UK	–	21 ~ 69	–	
SECAM L	FRANCE /CCIR	FB ~ F6	21 ~ 69	S1 ~ S41	X ~ Z + 2,

PAL, SECAM 50 Hz/60 Hz (For VCR playback)
4.43 NTSC (For VCR playback), 3.58 NTSC (For VCR playback)

Intermediate Frequencies:
Picture I-F carrier frequency ..... 38.9/33.95 MHz (L VL)
Sound I-F carrier frequency
- L System ..... 32.4 MHz (L VH, U)/40.45 MHz (L VL)
- B/G System ..... 33.4 MHz
- I System ..... 32.9 MHz
- D/K System ..... 32.4 MHz

Picture Tube: 28 inches, 660 mm (measured on diagonal of viewable picture area)
110° deflection

Sound Output: 5 W + 5 W (at 10% Distortion, Main)

Speakers: 60 mm x 120 mm oval, 2 pcs (Main)

Cabinet: Table type

Dimensions:
Height ..... 582.8 mm
Width ..... 755.9 mm
Depth ..... 476.0 mm

Mass: 33.5 kg

* Please refer to owner's manual.

TOSHIBA CORPORATION
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-8001, JAPAN

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